ENVIRONMENTAL ASSESSMENT
WEST COAST BASING OF C-17 AIRCRAFT

DEPARTMENT OF THE AIR FORCE
AIR MOBILITY COMMAND
SCOTT AIR FORCE BASE, ILLINOIS



JUNE 2003

Report Documentation Page

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14. ABSTRACT

Headquarters, Air Mobility Command (AMC) has a need to base 12 C-17 aircraft at an active duty west coast Air Force base as part of the airlift Mobility Transformation Plan to improve overall airlift capability. Under the Proposed Action, 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to Travis AFB, California. The action would also include relocating 16 of Travis AFB?s C-5 aircraft to an air reserve component installation. The number of assigned KC-10 aircraft would remain at 27 aircraft with the assigned C-17s, C-5s, and KC-10s totaling 60 aircraft. The C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on 19 military training routes (MTRs). Sixteen facility projects would be accomplished at Travis AFB as part of the Proposed Action. Under the Alternative Action, an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to McChord AFB, Washington, increasing the total number of C-17s to 60 aircraft. The additional C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on nine MTRs, and assault landings at the Grant County International Airport, Moses Lake, Washington. Sixteen facility projects would be accomplished at McChord AFB as part of the Alternative Action. Under the No Action Alternative, no additional C-17 aircraft other than the 48 aircraft planned for McChord AFB would be based at an AMC west coast military installation. Resources considered in the impact analysis were: air quality; noise; hazardous wastes hazardous materials and stored fuels; water resources; biological resources; socioeconomic resources; cultural resources; land use; infrastructure and utilities; airspace and airfield operations; environmental management; and environmental justice. No significant impacts would result from implementation of the Proposed or Alternative Actions or the No Action Alternative.

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FINDING OF NO SIGNIFICANT IMPACT
WEST COAST BASING OF C-17 AIRCRAFT

AGENCY

Department of the Air Force, Headquarters (HQ) Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois.

BACKGROUND

The Air Force Mobility Force Structure Briefing to Congress on April 15, 2002 presented an airlift Mobility Transformation Plan (the Plan) that proposes to standardize airlift aircraft fleets, increase reliability, lower operating and support costs, and increase airlift capability by 33 percent. As part of the Plan, HQ AMC has a need to base 12 C-17 aircraft at an active duty west coast Air Force base. The basing action will begin with facility construction projects in fiscal year (FY) 2003 and be complete in FY07 with arrival of the 12th C-17 aircraft.

PROPOSED ACTION

HQ AMC will base and operate 12 C-17 aircraft at Travis AFB, California (the base), and realign 16 C-5 aircraft from the base to an air reserve component installation, leaving 21 C-5 aircraft at the base. The number of assigned KC-10 aircraft will remain at 27 aircraft, with the assigned C-17s, C-5s, and KC-10s totaling 60 aircraft. A net loss of 161 Air Force active duty, reserve, and civilian personnel authorizations will occur as a result of the action. Travis AFB C-17 aircrews will use 19 military training routes (MTR) for low-level navigation training. Sixteen facility construction, addition, and alteration projects will occur to support basing and operation activities.

One of the 16 facility projects will realign a portion of Ragsdale Street through an open grassed area containing two vernal pools that may support endangered species. The two vernal pools comprise a total of 0.515 acre that could be directly affected. Additionally, there is another 0.485 acre within the area around the project site (*i.e.*, 250-feet on either side of the proposed alignment) to consider for indirect adverse effects. To mitigate or offset potential adverse effects to the vernal pools, the Air Force will provide for a mitigation bank of 2.515 acres in a suitable mitigation bank site approved by the United States Fish and Wildlife Service (USFWS).

C-17 aircrews are required to maintain proficiency in assault landing operations, which are accomplished on an assault landing zone (ALZ). There are no ALZs within a reasonable proximity to Travis AFB. As a result, an ALZ needs to be identified. However, a location for the ALZ has yet to be determined. Due to lack of availability of complete information, the proposed construction of an ALZ will undergo analysis for decision-making at a later time. In this particular case, the basing of C-17s at an active duty west coast Air Force base is ripe for decision. However, decisions to identify, operate, and support an ALZ for the Proposed Action have not yet been resolved. As a result, analyses specific to the proposed ALZ for the Proposed Action will be presented in a separate National Environmental Policy Act (NEPA) document that will include a cumulative impacts analysis of the entire Proposed Action (32 Code of Federal Regulations [CFR] 989.10). Analyses and impacts of assault landing operations at the Grant County Airport are representative of the analyses that will be accomplished when an ALZ is identified and assessed for the Proposed Action. Additionally, Grant County Airport, Moses Lake, Washington, the airfield McChord AFB aircrews currently use and would continue to use for assault landing operations under the alternative action, may be used for these operations by Travis AFB aircrews until an ALZ is identified and assessed for the Proposed Action.

ALTERNATIVE ACTION

HQ AMC will base and operate an additional 12 C-17 aircraft at McChord AFB, Washington, (the base) ultimately increasing the total number of C-17 aircraft at the base to 60 aircraft. A net increase of 631 Air Force active duty, reserve, and civilian personnel authorizations will occur as a result of the action. McChord C-17 aircrews will use nine MTRs currently scheduled and coordinated by the base for low-level navigation training. Assault landing operations and other practice instrument approaches, takeoffs, and landings will be accomplished at the Grant County Airport. Fifteen facility construction, addition, and alteration projects will occur to support basing and operation activities.

NO ACTION ALTERNATIVE

HQ AMC will continue to operate its current west coast airlift aircraft fleet until aircraft are retired from service because of age or realigned to another installation. No additional C-17 aircraft other than the 48 aircraft planned for McChord AFB under a separate action will be based at an AMC west coast military installation.

SUMMARY OF FINDINGS

Pursuant to NEPA guidance, 32 CFR 989 (*Air Force Environmental Impact Analysis Process*), and other applicable regulations, the Air Force completed an environmental assessment (EA) of the potential environmental consequences of west coast basing for C-17 aircraft. The EA, which supports this Finding of No Significant Impact (FONSI), evaluated the No Action Alternative, Proposed Action, and an Alternative Action.

EVALUATION OF THE NO ACTION ALTERNATIVE

Travis AFB. No significant impacts occur from the baseline activities.
McChord AFB. No significant impacts occur from the baseline activities.

EVALUATION OF THE PROPOSED ACTION, TRAVIS AFB

Air Quality. The greatest increase in emissions at Travis AFB will be nitrogen oxides (NO_x) (1,483.211 tons per year [tpy]) from recurring aircraft operations, equating to 0.06271 percent of the NO_x emissions within the air quality control region (AQCR). The Clean Air Act (CAA) General Conformity Applicability Analysis prepared for the action at Travis AFB concluded that the net change in emissions for criteria pollutants will not be regionally significant by United States Environmental Protection Agency standards, will not exceed *de minimis* thresholds, and that a Conformity Determination is not required. Emissions from C-17 operations on the MTRs within the 23 affected AQCRs and air basins will not be regionally significant.

Noise. The number of people exposed to Community Noise Equivalent Level (CNEL) 60 decibels (dB) and greater will decrease by 15 percent at and around Travis AFB. There will be a corresponding decrease in the potential for sleep awakenings, speech disruption, and classroom disruption; noise-induced hearing loss is not anticipated. Construction noise will be temporary, will occur only during daytime, and will cease when the project is completed. Noise from MTR operations will not exceed the level at which residential and other noise-sensitive land uses become unacceptable. C-17 MTR operations will not cause structural damage.

Hazardous Wastes, Hazardous Materials, and Stored Fuels. The volumes of hazardous material procured, hazardous waste generated, and jet fuel consumed will decrease by as much as 6 percent. The existing hazardous materials handling, hazardous waste disposal, and fuel storage processes and procedures will accommodate C-17 operation and maintenance activities.

Water Resources. Use of the erosion control and spill control measures in the storm water pollution prevention plans that will be prepared for construction projects will minimize the potential for surface and groundwater quality degradation. The amount of impervious cover will increase by about 1.4 percent, which could result in a corresponding increase in storm water runoff. The box culverts associated with

the Ragsdale Street relocation construction project will be constructed in accordance with design standards for floodplains and associated Clean Water Act Section 404 permit requirements.

Biological Resources. Design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the National Marine Fisheries Service (NMFS) to avoid affecting downstream riparian/aquatic habitat quality. Work within the wetlands and in the Union Creek channel will require Section 404/401 permits from the U.S. Army Corps of Engineers (USACE). Realigning Ragsdale Street will result in direct impact to two vernal pools and indirect impact to an additional vernal pool. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force will purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment. The analyses and conclusions in the EA are consistent with the Travis AFB Integrated Natural Resources Management Plan (INRMP), which was approved by the USFWS. MTR overflights will be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.

Socioeconomic Resources. Local and regional population will decrease by 364 (0.07 percent of the statistical area) as a result of the loss of 161 positions. Approximately 175 housing units (0.1 percent of the statistical area) will become vacant with the loss of personnel, with approximately one-half of these units being on-base and one-half being off-base. Enrollment in the school district nearest the base will decrease by approximately 112 children (2.2 percent). The increase in wages paid, business sales, and income to the local and regional economy from construction activities will end when all projects are completed. Wages paid, business sales, and income to the economy will decrease due to the reduction of 161 personnel.

Cultural Resources. The Proposed Action will result in construction adjacent to Bldg 810 and renovations to Bldg 1212, two properties eligible for listing on the National Register of Historic Places. Design and construction of both facilities will be conducted in accordance with the Travis AFB Cultural Resources Management Plan, and requirements identified during Section 106 consultation with the California State Historic Preservation Officer. Impacts to historic resources are not expected. Cultural resources impacts within the MTR corridors will not occur because the maximum noise from a C-17 is below the level at which vibration impacts occur. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2. As a result of a response from the Karuk Tribe of California and subsequent consultation, the Air Force coordinated with the Navy as the MTR originating/scheduling activity to establish overflight avoidance areas of 3 miles and not lower than 1,500 feet above ground level for two sites along VR-1250 where sacred ceremonies are conducted in the summer months.

Land Use. Facility construction will be consistent with existing and future land-use plans and programs identified in the Travis AFB General Plan. The landfill located in the southwest APZ I will continue to be incompatible with Air Force Air Installation Compatible Use Zone recommendations. No additional land use incompatibilities are anticipated. No significant impacts to sensitive land uses occur within the MTR corridors.

Infrastructure and Utilities. Water consumption and wastewater generation will decrease by 1.1 and 1.2 percent, respectively. Water used for dust control equates to about 1.6 percent of system capacity. Storm water system flows likely will increase by 1.4 percent due to the increase in impervious cover. The capacities of electrical and natural gas distribution systems are more than adequate to handle the 0.01 percent increase in demand for the new buildings. Construction and demolition debris disposal equates to less than 0.004 percent of the total remaining landfill capacity. Solid waste generated by personnel will decrease slightly due to the reduction in assigned personnel. On-base roadway volumes will decrease by about 1 percent.

Airspace and Airfield Operations. Existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, will accommodate C-17 operations at Travis AFB. Each MTR has the capacity to accommodate the additional operations, and the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the airfield at Travis AFB or on an MTR will strike a person or structure on the ground. The potential for bird-aircraft strikes associated with airfield operations at the base will be expected to decrease. It is anticipated that about five bird-aircraft strikes will occur annually from Travis AFB C-17 MTR operations.

Environmental Management. Project activities will not impact achieving pollution prevention goals. Asbestos containing material (ACM) and lead-based paint (LBP) will be removed in accordance with existing guidance. The new facilities will be constructed or renovated without any ACM and LBP. Facilities design and construction activities will be coordinated with the base Environmental Flight and Bioenvironmental Engineering Office to ensure that construction will avoid interference with any ongoing Environmental Restoration Program investigation and remediation work and will not worsen the condition of any site. Physiographic features will not be changed by facilities construction. Project activity will occur within areas in which the soils were previously disturbed.

EVALUATION OF THE ALTERNATIVE ACTION, MCCHORD AFB

Air Quality. The greatest increase in emissions at McChord AFB will be NO_x (861.855 tpy) from recurring aircraft operations, equating to 10.7732 percent of the NO_x emissions within the AQCR. Although the NO_x emissions in the AQCR exceed 10 percent of the baseline for the pollutant, the exceedance is slight. Additionally, the AQCR is in attainment for NO_x. The emissions for the other criteria pollutants will not exceed 10 percent of the emissions inventory. The air emissions at McChord AFB are not considered significant and a Conformity Determination is not required. The greatest increase in emissions at Grant County Airport will be NO_x (1,884.0 tpy) from recurring aircraft operations, equating to 102.9508 percent of the NO_x emissions within the AQCR. The AQCR is in attainment for NO_x; thus, the emissions are not regionally significant. Emissions for the other criteria pollutants will not exceed 10 percent of the emissions inventory. Emissions from C-17 operations on the MTRs within the affected AQCRs are not regionally significant.

Noise. An additional 510 people (14 percent) will be exposed to Day-Night Average Sound Level (DNL) of 65 dBA and greater. The density in the additionally exposed area will be 2.77 persons per acre, a density consistent with adjacent residential areas exposed to aircraft noise under the current condition. There will be a corresponding increase in the potential for sleep awakenings, speech disruption, and classroom disruption. Noise-induced hearing loss is not anticipated. Construction noise will be temporary, will occur only during daytime, and will cease when the project is completed. Noise from MTR operations will not exceed the level at which residential and other noise-sensitive land uses become unacceptable. C-17 MTR operations will not cause structural damage. The number of people exposed to DNL 65 dBA and greater will increase by 14 percent (3 persons) at and around Grant County Airport. There will be a corresponding increase in the potential for sleep awakenings and speech disruption. Noise-induced hearing loss is not anticipated.

Hazardous Wastes, Hazardous Materials, and Stored Fuels. The Proposed Action Summary applies, except that hazardous material procurement, hazardous waste generation, and jet fuel use could increase by 25 percent due to the increase from 48 to 60 assigned aircraft.

Water Resources. The Proposed Action Summary applies, except that the amount of impervious cover will increase by about 0.4 percent, which could result in a corresponding increase in storm water runoff. No facilities construction will occur in a floodplain.

Biological Resources. Construction activities will occur within developed, maintained areas with extant, highly modified and disturbed landscape, and will not substantially change habitat for plant or animal species. No endangered, threatened, or special status species are documented in the construction areas. No activities will occur within a wetland. MTR overflights will be infrequent, random, and pose no threat to wildlife.

Socioeconomic Resources. Local and regional population will increase by 1,500 (0.214 percent of the statistical area) as a result of a net gain of 631 positions. The current housing supply can accommodate demand for approximately 600 housing units. Enrollment of approximately 430 additional students in the school district nearest the base will increase enrollment by 3 percent. However, some of the other school districts within the county will absorb some of this enrollment increase. The additional personnel will increase wages paid, business sales, and income to the local and regional economy. Construction activities would result in wages paid, and expenditures for local and regional services and supplies during construction.

Cultural Resources. The alternative action will not result in any impacts to archaeological resources or properties eligible for inclusion on the National Register of Historic Places. Construction will not occur within the McChord Field Historic District. Cultural resource impacts within the MTR corridors and impacts to Native American interests will be the same as described for the Proposed Action.

Land Use. Facility construction will be consistent with existing and future land use plans and programs identified in the McChord AFB General Plan. Additional exposure to DNL 65-70 dBA will occur in off-base areas not currently exposed to this level of noise. Although residences are not recommended in these noise zones unless attenuation materials are installed, the number of additionally exposed residences in the DNL 65-70 dBA noise zone will be extremely small when compared to the baseline. Additionally, the condition (*i.e.*, additional residences in the DNL 65-70 dBA noise zone) will be consistent with existing land use in the area because other residences occur in these noise zones. Therefore, the additional noise exposure from the alternative action is not inconsistent with local land use plans. No significant impacts to sensitive land uses occur within the MTR corridors. Land use plans for the local community at Grant County Airport will not be affected.

Infrastructure and Utilities. Water consumption and wastewater generation will increase by 1.5 and 0.7 percent, respectively. Water used for dust control equates to about 4.5 percent of system capacity. Storm water system flows likely will increase by 0.4 percent due to the increase in impervious cover. The capacities of electrical and natural gas distribution systems are more than adequate to handle the increased demand for the new buildings. Construction and demolition debris disposal equates to less than 0.1 percent of the total remaining landfill capacity. Solid waste generated by personnel will increase slightly due to the additionally assigned personnel. On-base roadway volumes will increase by about 6 percent.

Airspace and Airfield Operations. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, will accommodate the additional C-17 operations at McChord AFB and Grant County Airport. Each MTR has the capacity to accommodate the additional operations, and the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the airfields at McChord AFB and Grant County Airport or on an MTR will strike a person or structure on the ground. It is estimated that about 31 bird-aircraft strikes will occur for a 1-year period in the area around the base. It is anticipated that about five bird-aircraft strikes will occur annually from McChord AFB C-17 MTR operations.

Environmental Management. The summary for the Proposed Action applies to the alternative.

ENVIRONMENTAL JUSTICE

Based on analysis conducted for this EA, it is determined that activities associated with the Proposed Action, Alternative Action, and No Action Alternative would not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects would occur to minority and low-income populations.

Finding of No Practicable Alternative

This Finding of No Practicable Alternative (FONPA) addresses one of the 16 Proposed Action construction projects, specifically, to realign Ragsdale Street and connect T and Boyles Streets under the Proposed Action at Travis AFB. The FONPA documents the Air Force's compliance with Executive Order (EO) 11990, *Protection of Wetlands*, and EO 11988, *Floodplain Management*. The EOs direct federal agencies to provide leadership and take action to reduce risk of flood loss, to minimize the impact of flood on human safety, health, and welfare, minimize destruction, loss, or degradation of wetlands, and to restore, preserve, and enhance the natural and beneficial values served by wetlands and floodplains.

Both EOs require that an agency shall avoid undertaking or providing assistance for new construction located in wetlands and floodplains. The EOs also require that if the head of the agency finds no practicable alternative to such construction, they must ensure that the proposed action includes all practicable measures to minimize harm to wetlands and floodplains that may result from such use.

There is a need to realign Ragsdale Street to meet the intersection of Ellis Drive and Dixon Avenue. Ragsdale Street, the route primarily used to travel between the South Gate and the main area of the base,

runs parallel to a row of aircraft hangars. This area has considerable traffic associated with aircraft maintenance activity in the hangars and surrounding area. Thus, traffic congestion occurs often. A secondary route is Ragsdale Street-Ellis Drive-Dixon Avenue. However, the need to make 90-degree turns at the intersections of Ellis Drive and Dixon Avenue and Ragsdale Street and Ellis Drive makes it difficult for trucks to make the turn and remain on the road surface due to the narrow width of the roads. Additionally, other facilities such as squadron operations that house large numbers of people will be constructed across from the aircraft hangars along Ragsdale Street, an action that will add to traffic congestion in the area and further impair traffic along Ragsdale Street. Realigning Ragsdale Street to meet Dixon Avenue will eliminate congestion in the area of the hangars and the new facilities as well as the turning difficulties at the intersections of Ellis Drive and Dixon Avenue and Ellis Drive and Ragsdale Street.

The Air Force developed the following alternatives to correct the traffic deficiencies along Ragsdale Street.

- Take no action.
- Widen Dixon Avenue and Ellis Drive.
- Realign Ragsdale Street in a reasonably direct route between Ragsdale Street and Dixon Avenue and span Union Creek with either a box culvert or a bridge.

The Air Force accomplished an analysis and elimination process to select the best alternative to correct the Ragsdale Street traffic deficiencies.

Taking no action would impair the ability of the base to accomplish its mission by not correcting traffic congestion or resolving force protection requirements (*i.e.*, keeping traffic flow away from the flightline).

Widening Dixon Avenue and Ellis Drive would not eliminate the difficulty of making 90-degree turns at the intersections of Ellis Drive and Dixon Avenue and Ragsdale Street and Ellis Drive. This alternative also would require construction of a bridge or box culvert where Ellis Drive crosses Union Creek.

Realigning Ragsdale Street in a reasonably direct route and spanning Union Creek with either a box culvert or a bridge would eliminate traffic congestion issues in the hangar area. A reasonably direct route was identified that would minimize activity in wetlands associated with Union Creek. The potential for wetlands and floodplain impacts occurs with either the culvert or bridge options since the routing would be the same, as would the amount of wetlands and width of the floodplain encountered. A box culvert would be advantageous from a construction cost perspective.

Based on the alternatives elimination process, the preferred alternative to correct traffic deficiencies is to realign Ragsdale Street and cross the creek with a box culvert. The project to connect the east end of T Street with the west end of Boyles Street will allow direct access to the hangar area. Given the short distance between the ends of T and Boyles Streets, no routing alternatives are available. The proposed realignment of Ragsdale Street to meet the intersection of Ellis Drive and Dixon Avenue and connecting T and Boyles Streets would potentially result in the loss of 0.515 acre (direct fill) and 0.485 acre (indirect fill) of wetland.

Realigning Ragsdale Street and connecting T and Boyles Streets will require new crossings over the west branch of Union Creek and installation of box culverts at these locations. The Ragsdale Street realignment will cross a riparian wetland and floodplain along the western branch of Union Creek. The sites where the Ragsdale Street and T and Boyles Streets box culverts will cross Union Creek exhibit degraded habitat conditions in industrial surroundings. The waterway is channelized at these locations, and exotic species of vegetation are present. These stretches of Union Creek do not contain riparian vegetation or hydrologic conditions that would support riparian vegetation. The design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the NMFS, Southwestern Region. Design considerations will include hydraulic and structural features to enable fish passage as specified in the NMFS guidance. Work within the wetlands and in the Union Creek channel will require a Section 404/401 permit from the USACE. The construction contractor will prepare and implement a storm water pollution prevention plan containing management practices to control sediment entering Union Creek. The contractor will install a debris curtain or other sediment control/protective barrier during any work in the creek that occurs when water is present. With incorporation of these measures, adverse effects to floodplains, wetlands, and habitats will be avoided.

The Ragsdale Street realignment will cross a vacant field north of Ellis Drive and west of Ragsdale Street, and will result in direct impact to two vernal pools, Numbers 151 (low quality) and 152 (high quality), and indirect impact to another pool in the project area. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment.

Pursuant to EOs 11988 and 11990, and taking the above information into account, there is no practicable alternative to the construction associated with realigning Ragsdale Street and connecting T and Boyles Streets (with box culverts to cross Union Creek at two locations), and that the Proposed Action includes all practicable measures to minimize harm.

DECISION

Based on my review of the facts and analyses contained in the EA, I conclude that implementation of either the Proposed Action or Alternative Action will not have a significant impact either by itself or when considering cumulative impacts. Accordingly, requirements of the NEPA, regulations promulgated by the Council on Environmental Quality, and 32 CFR 989 are fulfilled and an environmental impact statement is not required.

21 JUL 2003

JOHN R. BAKER
Lieutenant General, USAF
Vice Commander

Date

FINDING OF NO SIGNIFICANT IMPACT
WEST COAST BASING OF C-17 AIRCRAFT

AGENCY

Department of the Air Force, Headquarters (HQ), Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois.

BACKGROUND

The Air Force Mobility Force Structure Briefing to Congress on April 15, 2002 presented an airlift Mobility Transformation Plan (the Plan) that proposes to standardize airlift aircraft fleets, increase reliability, lower operating and support costs, and increase airlift capability by 33 percent. As part of the Plan, HQ AMC has a need to base 12 C-17 aircraft at an active duty west coast Air Force base. The basing action will begin with facility construction projects in fiscal year (FY) 2003 and be complete in FY07 with arrival of the 12th C-17 aircraft.

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One of the 16 facility projects will realign a portion of Ragsdale Street through an open grassed area containing two vernal pools that may support endangered species. The two vernal pools comprise a total of 0.515 acre that could be directly affected. Additionally, there is another 0.485 acre within the area around the project site (*i.e.*, 250-feet on either side of the proposed alignment) to consider for indirect adverse effects. To mitigate or offset potential adverse effects to the vernal pools, the Air Force will provide for a mitigation bank of 2.515 acres in a suitable mitigation bank site approved by the United States Fish and Wildlife Service (USFWS).

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ALTERNATIVE ACTION

HQ AMC will base and operate an additional 12 C-17 aircraft at McChord AFB, Washington, (the Base) ultimately increasing the total number of C-17 aircraft at the Base to 60 aircraft. A net increase of 631 active Air Force active duty, reserve, and civilian personnel authorizations will occur as a result of the action. McChord C-17 aircrews will use nine MTRs currently scheduled and coordinated by the Base for low-level navigation training. Assault landing operations and other practice instrument approaches, takeoffs, and landings will be accomplished at the Grant County Airport. Sixteen facility construction, addition, and alteration projects will occur to support basing and operation activities.

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EVALUATION OF THE PROPOSED ACTION, TRAVIS AFB

Air Quality. The greatest increase in emissions at Travis AFB will be nitrogen oxides (NO_x) (1,483.211 tons per year [tpy]) from recurring aircraft operations, equating to 0.06271 percent of the NO_x emissions within the air quality control region (AQCR). The Clean Air Act (CAA) General Conformity Applicability Analysis prepared for the action at Travis AFB concluded that the net change in emissions for criteria pollutants will not be regionally significant by United States Environmental Protection Agency standards, will not exceed *de minimis* thresholds, and that a Conformity Determination is not required. Emissions from C-17 operations on the MTRs within the 23 affected AQCRs and air basins will not be regionally significant.

Noise. The number of people exposed to Community Noise Equivalent Level (CNEL) 60 decibels (dB) and greater will decrease by 15 percent at and around Travis AFB. There will be a corresponding decrease in the potential for sleep awakenings, speech disruption, and classroom disruption; noise-induced hearing loss is not anticipated. Construction noise will be temporary, will occur only during daytime, and will cease when the project is completed. Noise from MTR operations will not exceed the level at which residential and other noise-sensitive land uses become unacceptable. C-17 MTR operations will not cause structural damage.

Hazardous Wastes, Hazardous Materials, and Stored Fuels. The volumes of hazardous material procured, hazardous waste generated, and jet fuel consumed will decrease by as much as 6 percent. The existing hazardous materials handling, hazardous waste disposal, and fuel storage processes and procedures will accommodate C-17 operation and maintenance activities.

Water Resources. Use of the erosion control and spill control measures in the storm water pollution prevention plans that will be prepared for construction projects will minimize the potential

for surface and groundwater quality degradation. The amount of impervious cover will increase by about 1.4 percent, which could result in a corresponding increase in storm water runoff. The box culverts associated with the Ragsdale Street relocation construction project will be constructed in accordance with design standards for floodplains and associated Clean Water Act Section 404 permit requirements.

Biological Resources. Design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the National Marine Fisheries Service (NMFS) to avoid affecting downstream riparian/aquatic habitat quality. Work within the wetlands and in the Union Creek channel will require Section 404/401 permits from the U.S. Army Corps of Engineers (USACE). Realigning Ragsdale Street will result in direct impact to two vernal pools and indirect impact to an additional vernal pool. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force will purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment. The analyses and conclusions in the EA are consistent with the Travis AFB Integrated Natural Resources Management Plan (INRMP), which was approved by the USFWS. MTR overflights will be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.

Socioeconomic Resources. Local and regional population will decrease by 364 (0.07 percent of the statistical area) as a result of the loss of 161 positions. Approximately 175 housing units (0.1 percent of the statistical area) will become vacant with the loss of personnel, with approximately one-half of these units being on-Base and one-half being off-Base. Enrollment in the school district nearest the Base will decrease by approximately 112 children (2.2 percent). The increase in wages paid, business sales, and income to the local and regional economy from construction activities will end when all projects are completed. Wages paid, business sales, and income to the economy will decrease due to the reduction of 161 personnel.

Cultural Resources. The Proposed Action will result in construction adjacent to Bldg. 810 and renovations to Bldg. 1212, two properties eligible for listing on the National Register of Historic Places. Design and construction of both facilities will be conducted in accordance with the Travis AFB Cultural Resources Management Plan, and requirements identified during Section 106 consultation with the California State Historic Preservation Officer. Impacts to historic resources are not expected. Cultural resources impacts within the MTR corridors will not occur because the maximum noise from a C-17 is below the level at which vibration impacts occur. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2. As a result of a response from the Karuk Tribe of California and subsequent consultation, the Air Force coordinated with the Navy as the MTR originating/scheduling activity to establish overflight avoidance areas of 3 miles and not lower than 1,500 feet above ground level for two sites along VR-1250 where sacred ceremonies are conducted in the summer months.

Land Use. Facility construction will be consistent with existing and future land use plans and programs identified in the Travis AFB General Plan. The landfill located in the southwest APZ I will continue to be incompatible with Air Force Air Installation Compatible Use Zone recommendations. No additional land use incompatibilities are anticipated. No significant impacts to sensitive land uses occur within the MTR corridors.

Infrastructure and Utilities. Water consumption and wastewater generation will decrease by 1.1 and 1.2 percent, respectively. Water used for dust control equates to about 1.6 percent of system capacity. Storm water system flows likely will increase by 1.4 percent due to the increase in impervious cover. The capacities of electrical and natural gas distribution systems are more than adequate to handle the 0.01 percent increase in demand for the new buildings. Construction and demolition debris disposal equates to less than 0.004 percent of the total remaining landfill capacity. Solid waste generated by personnel will decrease slightly due to the reduction in assigned personnel. On-Base roadway volumes will decrease by about 1 percent.

Airspace and Airfield Operations. Existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, will accommodate C--17 operations at Travis AFB. Each MTR has the capacity to accommodate the additional operations, and

the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the airfield at Travis AFB or on an MTR will strike a person or structure on the ground. The potential for bird-aircraft strikes associated with airfield operations at the Base will be expected to decrease. It is anticipated that about five bird-aircraft strikes will occur annually from Travis AFB C-17 MTR operations.

Environmental Management. Project activities will not impact achieving pollution prevention goals. Asbestos containing material (ACM) and lead-based paint (LBP) will be removed in accordance with existing guidance. The new facilities will be constructed or renovated without any ACM and LBP. Facilities design and construction activities will be coordinated with the Base Environmental Flight and Bioenvironmental Engineering Office to ensure that construction will avoid interference with any ongoing Environmental Restoration Program investigation and remediation work and will not worsen the condition of any site. Physiographic features will not be changed by facilities construction. Project activity will occur within areas in which the soils were previously disturbed.

EVALUATION OF THE ALTERNATIVE ACTION, MCCHORD AFB

Air Quality. The greatest increase in emissions at McChord AFB will be NO_x (861.855 tpy) from recurring aircraft operations, equating to 10.7732 percent of the NO_x emissions within the AQCR. Although the NO_x emissions in the AQCR exceed 10 percent of the baseline for the pollutant, the exceedance is slight. Additionally, the AQCR is in attainment for NO_x. The emissions for the other criteria pollutants will not exceed 10 percent of the emissions inventory. The air emissions at McChord AFB are not considered significant and a Conformity Determination is not required. The greatest increase in emissions at Grant County Airport will be NO_x (1,884.0 tpy) from recurring aircraft operations, equating to 102.9508 percent of the NO_x emissions within the AQCR. The AQCR is in attainment for NO_x; thus, the emissions are not regionally significant. Emissions for the other criteria pollutants will not exceed 10 percent of the emissions inventory. Emissions from C-17 operations on the MTRs within the affected AQCRs are not regionally significant.

Noise. An additional 510 people (14 percent) will be exposed to Day-Night Average Sound Level (DNL) 65 dBA and greater. The density in the additionally exposed area will be 2.77 persons per acre, a density consistent with adjacent residential areas exposed to aircraft noise under the current condition. There will be a corresponding increase in the potential for sleep awakenings, speech disruption, and classroom disruption. Noise-induced hearing loss is not anticipated. Construction noise will be temporary, will occur only during daytime, and will cease when the project is completed. Noise from MTR operations will not exceed the level at which residential and other noise-sensitive land uses become unacceptable. C-17 MTR operations will not cause structural damage. The number of people exposed to DNL 65 dBA and greater will increase by 14 percent (3 persons) at and around Grant County Airport. There will be a corresponding increase in the potential for sleep awakenings and speech disruption. Noise-induced hearing loss is not anticipated.

Hazardous Wastes, Hazardous Materials, and Stored Fuels. The Proposed Action Summary applies, except that hazardous material procurement, hazardous waste generation, and jet fuel use could increase by 25 percent due to the increase from 48 to 60 assigned aircraft.

Water Resources. The Proposed Action Summary applies, except that the amount of impervious cover will increase by about 0.4 percent, which could result in a corresponding increase in storm water runoff. No facilities construction will occur in a floodplain.

Biological Resources. Construction activities will occur within developed, maintained areas with extant, highly modified and disturbed landscape, and will not substantially change habitat for plant or animal species. No endangered, threatened, or special status species are documented in the construction areas. No activities will occur within a wetland. MTR overflights will be infrequent, random, and pose no threat to wildlife.

Socioeconomic Resources. Local and regional population will increase by 1,500 (0.214 percent of the statistical area) as a result of a net gain of 631 positions. The current housing supply can accommodate demand for approximately 600 housing units. Enrollment of approximately 430 additional students in the school district nearest the Base will increase enrollment

by 3 percent. However, some of the other school districts within the county will absorb some of this enrollment increase. The additional personnel will increase wages paid, business sales, and income to the local and regional economy. Construction activities would result in wages paid, and expenditures for local and regional services and supplies during construction.

Cultural Resources. The Alternative Action will not result in any impacts to archaeological resources or properties eligible for inclusion on the National Register of Historic Places. Construction will not occur within the McChord Field Historic District. Cultural resource impacts within the MTR corridors and impacts to Native American interests will be the same as described for the Proposed Action.

Land Use. Facility construction will be consistent with existing and future land use plans and programs identified in the McChord AFB General Plan. Additional exposure to DNL 65-70 dBA will occur in off-Base areas not currently exposed to this level of noise. Although residences are not recommended in these noise zones unless attenuation materials are installed, the number of additionally exposed residences in the DNL 65-70 dBA noise zone will be extremely small when compared to the baseline. Additionally, the condition (*i.e.*, additional residences in the DNL 65-70 dBA noise zone) will be consistent with existing land use in the area because other residences occur in these noise zones. Therefore, the additional noise exposure from the Alternative Action is not inconsistent with local land use plans. No significant impacts to sensitive land uses occur within the MTR corridors. Land use plans for the local community at Grant County Airport will not be affected.

Infrastructure and Utilities. Water consumption and wastewater generation will increase by 1.5 and 0.7 percent, respectively. Water used for dust control equates to about 4.5 percent of system capacity. Storm water system flows likely will increase by 0.4 percent due to the increase in impervious cover. The capacities of electrical and natural gas distribution systems are more than adequate to handle the increased demand for the new buildings. Construction and demolition debris disposal equates to less than 0.1 percent of the total remaining landfill capacity. Solid waste generated by personnel will increase slightly due to the additionally assigned personnel. On-Base roadway volumes will increase by about 6 percent.

Airspace and Airfield Operations. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, will accommodate the additional C-17 operations at McChord AFB and Grant County Airport. Each MTR has the capacity to accommodate the additional operations, and the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the airfields at McChord AFB and Grant County Airport or on an MTR will strike a person or structure on the ground. It is estimated that about 31 bird-aircraft strikes will occur for a 1-year period in the area around the Base. It is anticipated that about five bird-aircraft strikes will occur annually from McChord AFB C-17 MTR operations.

Environmental Management. The summary for the Proposed Action applies to the alternative.

ENVIRONMENTAL JUSTICE

Based on analysis conducted for this EA, it is determined that activities associated with the Proposed Action, Alternative Action, and No Action Alternative would not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects would occur to minority and low-income populations.

Finding of No Practicable Alternative

This Finding of No Practicable Alternative (FONPA) addresses one of the 16 Proposed Action construction projects, specifically to realign Ragsdale Street and connect T and Boyles Streets under the Proposed Action at Travis AFB. The FONPA documents the Air Force's compliance with Executive Order (EO) 11990, *Protection of Wetlands*, and EO 11988, *Floodplain Management*. The EOs direct federal agencies to provide leadership and take action to reduce risk of flood loss, to

minimize the impact of flood on human safety, health and welfare, minimize destruction, loss, or degradation of wetlands, and to restore, preserve, and enhance the natural and beneficial values served by wetlands and floodplains.

Both EOs require that an agency shall avoid undertaking or providing assistance for new construction located in wetlands and floodplains. The EOs also require that if the head of the agency finds no practicable alternative to such construction, they must ensure that the proposed action includes all practicable measures to minimize harm to wetlands and floodplains that may result from such use.

There is a need to realign Ragsdale Street to meet the intersection of Ellis Drive and Dixon Avenue. Ragsdale Street, the route primarily used to travel between the South Gate and the main area of the Base, runs parallel to a row of aircraft hangars. This area has considerable traffic associated with aircraft maintenance activity in the hangars and surrounding area. Thus, traffic congestion occurs often. A secondary route is Ragsdale Street-Ellis Drive-Dixon Avenue. However, the need to make 90°turns at the intersections of Ellis Drive and Dixon Avenue and Ragsdale Street and Ellis Drive makes it difficult for trucks to make the turn and remain on the road surface due to the narrow width of the roads. Additionally, other facilities such as squadron operations that house large numbers of people will be constructed across from the aircraft hangars along Ragsdale Street, an action that will add to traffic congestion in the area and further impair traffic along Ragsdale Street. Realigning Ragsdale Street to meet Dixon Avenue will eliminate congestion in the area of the hangars and the new facilities as well as the turning difficulties at the intersections of Ellis Drive and Dixon Avenue and Ellis Drive and Ragsdale Street.

The Air Force developed the following alternatives to correct the traffic deficiencies along Ragsdale Street.

- Take no action.
- Widen Dixon Avenue and Ellis Drive.
- Realign Ragsdale Street in a reasonably direct route between Ragsdale Street and Dixon Avenue and span Union Creek with either a box culvert or a bridge.

The Air Force accomplished an analysis and elimination process to select the best alternative to correct the Ragsdale Street traffic deficiencies.

Taking no action would impair the ability of the Base to accomplish its mission by not correcting traffic congestion or resolving force protection requirements (*i.e.*, keeping traffic flow away from the flightline).

Widening Dixon Avenue and Ellis Drive would not eliminate the difficulty of making 90-degree turns at the intersections of Ellis Drive and Dixon Avenue and Ragsdale Street and Ellis Drive. This alternative also would require construction of a bridge or box culvert where Ellis Drive crosses Union Creek.

Realigning Ragsdale Street in a reasonably direct route and spanning Union Creek with either a box culvert or a bridge would eliminate traffic congestion issues in the hangar area. A reasonably direct route was identified that would minimize activity in wetlands associated with Union Creek. The potential for wetlands and floodplain impacts occurs with either the culvert or bridge options since the routing would be the same, as would the amount of wetlands and width of the floodplain encountered. A box culvert would be advantageous from a construction cost perspective.

Based on the alternatives elimination process, the preferred alternative to correct traffic deficiencies is to realign Ragsdale Street and cross the creek with a box culvert. The project to connect the east end of T Street with the west end of Boyles Street will allow direct access to the hangar area. Given the short distance between the ends of T and Boyles Streets, no routing alternatives are available. The proposed realignment of Ragsdale Street to meet the intersection of Ellis Drive and Dixon Avenue and connecting T and Boyles Streets would potentially result in the loss of 0.515 acre (direct fill) and 0.485 acre (indirect fill) of wetland.

Realigning Ragsdale Street and connecting T and Boyles Streets will require new crossings over the west branch of Union Creek and installation of box culverts at these locations. The Ragsdale

Street realignment will cross a riparian wetland and floodplain along the western branch of Union Creek. The sites where the Ragsdale Street and T and Boyles Streets box culverts will cross Union Creek exhibit degraded habitat conditions in industrial surroundings. The waterway is channelized at these locations, and exotic species of vegetation are present. These stretches of Union Creek do not contain riparian vegetation or hydrologic conditions that would support riparian vegetation. The design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the NMFS, Southwestern Region. Design considerations will include hydraulic and structural features to enable fish passage as specified in the NMFS guidance. Work within the wetlands and in the Union Creek channel will require a Section 404/401 permit from the USACE. The construction contractor will prepare and implement a storm water pollution prevention plan containing management practices to control sediment entering Union Creek. The contractor will install a debris curtain or other sediment control/protective barrier during any work in the creek that occurs when water is present. With incorporation of these measures, adverse effects to floodplains, wetlands, and habitats will be avoided.

The Ragsdale Street realignment will cross a vacant field north of Ellis Drive and west of Ragsdale Street, and will result in direct impact to two vernal pools, Numbers 151 (low quality) and 152 (high quality), and indirect impact to another pool in the project area. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment.

Pursuant to EOs 11988 and 11990, and taking the above information into account, there is no practicable alternative to the construction associated with realigning Ragsdale Street and connecting T and Boyles streets (with box culverts to cross Union Creek at two locations), and that the Proposed Action includes all practicable measures to minimize harm.

DECISION

Based on my review of the facts and analyses contained in the EA, I conclude that implementation of either the Proposed Action or Alternative Action will not have a significant impact either by itself or when considering cumulative impacts. Accordingly, requirements of the NEPA, regulations promulgated by the Council on Environmental Quality, and 32 CFR 989 are fulfilled and an environmental impact statement is not required.

JOHN R. BAKER, Lieutenant General, USAF
Vice Commander, Air Mobility Command

Date

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Environmental Assessment
West Coast Basing of C-17 Aircraft

Department of the Air Force
Air Mobility Command
Scott Air Force Base, Illinois

June 2003

 Printed on recycled paper

COVER SHEET
ENVIRONMENTAL ASSESSMENT
West Coast Basing of C-17 Aircraft

Responsible Agency: Department of the Air Force, Air Mobility Command, Scott Air Force Base, Illinois.

Proposed Action: Base C-17 aircraft at a west coast Air Force base

Written comments and inquiries regarding this document should be directed to: Lt. Col. John Keoshian, HQ AMC/CEVP, 507 Symington Drive, Scott AFB, Illinois 62225-5022, (618) 229-0841, email: john.keoshian@scott.af.mil.

Report Designation: Environmental Assessment

Abstract: Headquarters, Air Mobility Command (AMC) has a need to base 12 C-17 aircraft at an active duty west coast Air Force base as part of the airlift Mobility Transformation Plan to improve overall airlift capability. Under the Proposed Action, 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to Travis AFB, California. The action would also include relocating 16 of Travis AFB's C-5 aircraft to an air reserve component installation. The number of assigned KC-10 aircraft would remain at 27 aircraft, with the assigned C-17s, C-5s, and KC-10s totaling 60 aircraft. The C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on 19 military training routes (MTRs). Sixteen facility projects would be accomplished at Travis AFB as part of the Proposed Action. Under the Alternative Action, an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to McChord AFB, Washington, increasing the total number of C-17s to 60 aircraft. The additional C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on nine MTRs, and assault landings at the Grant County International Airport, Moses Lake, Washington. Sixteen facility projects would be accomplished at McChord AFB as part of the Alternative Action. Under the No Action Alternative, no additional C-17 aircraft other than the 48 aircraft planned for McChord AFB would be based at an AMC west coast military installation. Resources considered in the impact analysis were: air quality; noise; hazardous wastes, hazardous materials and stored fuels; water resources; biological resources; socioeconomic resources; cultural resources; land use; infrastructure and utilities; airspace and airfield operations; environmental management; and environmental justice. No significant impacts would result from implementation of the Proposed or Alternative Actions or the No Action Alternative.

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EXECUTIVE SUMMARY

ES 1 Introduction

The Air Force Mobility Force Structure Briefing to Congress on April 15, 2002 presented an airlift Mobility Transformation Plan (the Plan) that proposes to standardize airlift aircraft fleets, increase reliability, lower operating and support costs, and increase airlift capability by 33 percent. The minimum airlift requirement, as determined by the Mobility Requirement Study 2005 to support the national military strategy requires the ability to airlift 54.5 million ton miles per day, while the current capability is 45.8 million ton miles. The Plan, which extends through the year 2017, would allow the Air Force to address the increasing demand for airlift with newer, more reliable aircraft and improved overall support.

A total of 53 active duty Air Force and air reserve component (ARC, *i.e.*, Air Force Reserve Command [AFRC] and Air National Guard [ANG]) military installations nationwide would be affected by the Plan outlined in the Mobility Force Structure Briefing. As part of the overall Plan, Headquarters, Air Mobility Command (HQ AMC) at Scott AFB, Illinois proposes to base 12 C-17 aircraft at an active duty west coast Air Force base. It is estimated that activities associated with the basing action would begin in Fall 2003. Two basing options are being considered in detail.

- Travis AFB, California, located adjacent to the City of Fairfield about 50 miles northeast of San Francisco. Aircraft based at Travis AFB include the C-5, a strategic cargo transport aircraft, and the KC-10, primarily an aerial refueling aircraft that also has cargo transport capability.
- McChord AFB, Washington, located adjacent to the City of Lakewood about 10 miles south of the City of Tacoma. McChord AFB is converting from C-141 to 48 assigned C-17 aircraft. It is anticipated the conversion will be complete in 2004. McChord AFB aircrews use the Grant County International Airport, Moses Lake, Washington for assault landing training, as would the aircrews associated with the additional C-17 aircraft that would be located at the Base.

ES 2 Need for Action

The need for the action is to base 12 C-17 aircraft at an active duty west coast Air Force base as part of the Plan to improve overall airlift capability. As part of the Plan, the Air Force determined it to be operationally prudent to maintain a robust airlift capability on the west coast to contribute to the overall airlift requirement of 54.5 million ton miles per day. Specifically, basing C-17 aircraft at a west coast location would enhance the capability of the Air Force to meet the national military strategy by modernizing strategic and tactical airlift aircraft on the west coast.

ES 3 Alternatives including the Proposed Action

ES 3.1 Alternative Selection Process

Selection criteria for use in developing and evaluating alternatives for basing 12 C-17 aircraft at a west coast military installation included:

- Adequate existing facilities at the military installation at which the aircraft would be based. If existing facilities are inadequate, the installation must have sufficient space to construct the needed facilities.
- An operational runway at the military installation at which the aircraft would be based.
- It is highly desirable that the military installation at which the aircraft would be based have a Reserve Associate unit at the installation since utilization of the C-17 aircraft is increased through the Reserve Associate concept.
- The military installation at which the aircraft would be based must have an airlift mission to avoid the potential for operational incompatibilities that can occur when aircraft with dissimilar operating parameters such as large, slower airlift and small, faster fighter aircraft operate from the same runway.
- The action would not create or dissolve airlift units.

ES 3.2 Alternatives Considered but Eliminated from Further Consideration

Five potential alternatives, including the No Action Alternative, were developed for basing 12 C-17 aircraft at a west coast military installation:

- Base 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel at Travis AFB and relocate 16 of Travis AFB's C-5 aircraft to another ARC installation.
- Base an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel at McChord AFB, increasing the total number of C-17s to 60 aircraft.
- Base 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel at Fairchild AFB, Spokane, Washington, which currently has 56 KC-135 aircraft.
- Base an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance at March Air Reserve Base (ARB), Riverside, California, which is projected to convert from C-141 and KC-135 aircraft to C-17 aircraft.
- Continue to operate the current west coast airlift fleet until aircraft are retired or realigned because of age.

Only Travis and McChord AFBs met all the basing criteria and, therefore, are considered in detail in the EA as the Proposed Action and Alternative Action, respectively.

ES 3.3 No Action Alternative

Under the No Action Alternative, the AMC would continue to operate its current west coast airlift aircraft fleet until aircraft are retired from service because of age or realigned to another installation. No additional C-17 aircraft other than the 48 aircraft planned for McChord AFB would be based at an AMC west coast military installation.

Travis AFB

Travis AFB would continue to operate 37 C-5 and 27 KC-10 aircraft. The number of Air Force active duty, reserve, and civilian authorizations, as well as contractor personnel at the Base, would remain at current levels (14,357 personnel). Travis AFB C-5 aircrews would continue to fly about 1,577 annual missions and training sorties, while there would be about 2,270 annual KC-10 sorties. Based and transient aircraft would accomplish about 76,992 airfield operations annually, or an average of 242.81 daily operations.

McChord AFB

McChord AFB would operate the 48 C-17 aircraft scheduled for the Base when the basing action is completed in FY 2004. The number of Air Force active duty, reserve, and civilian authorizations, as well as contractor personnel at the Base, would remain at the levels anticipated for the 48 assigned aircraft condition (9,850 personnel). McChord AFB aircrews would fly about 3,645 annual sorties. Based and transient aircraft would accomplish about 32,980 airfield operations annually at McChord AFB, or an average of 91.62 daily operations. McChord AFB C-17s would accomplish about 41,255 airfield operations annually at the Grant County Airport, or an average of 114.48 daily operations. Base aircrews would fly about 3,200 annual sorties on nine MTRs, or about 266 sorties per month.

ES 3.4 Proposed Action, Travis AFB

Under the Proposed Action, the Air Force would base and operate 12 C-17 aircraft at Travis AFB and realign 16 C-5 aircraft from the Base to an ARC installation, leaving 21 C-5 aircraft at the Base. The number of C-5s would steadily draw down as the number of C-17s increased. The number of assigned KC-10 aircraft would not be affected by the action and would remain at 27 aircraft, with the assigned C-17s, C-5s, and KC-10s totaling 60 aircraft. A net loss of 161 Air Force active duty, reserve, and personnel authorizations would occur as a result of the action, decreasing the Base workforce to 14,196 persons. Travis AFB C-17 aircrews would use 19 MTRs, all of which could be used for low-level navigation training. Sixteen facility construction, addition, and alteration projects would occur to support basing and operation activities. The basing action would begin in FY03 with facility construction projects and be complete in FY07 with the arrival of the 12th C-17 aircraft.

One of the 16 facility projects would realign a portion of Ragsdale Street through an open grassed area containing two vernal pools that may support endangered species. The two vernal pools comprise a total 0.515 acre that could be directly affected. Additionally, there is another

0.485 acre vernal pool within the area around the project site to consider for being indirectly affected. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment.

Approximately 778 training sorties would be flown annually from Travis AFB by the 12 assigned C-17 aircraft. It is estimated that about 315 annual C-17 mission sorties would be flown where the aircraft depart the Base for a worldwide airlift mission that supports the national military strategy. About 6,991 annual C-17 airfield operations (19.90 daily operations) would occur at Travis AFB, and the total annual operations for based and transient aircraft would be approximately 73,861 operations (230.14 daily operations). C-17 aircrews would fly about 788 annual sorties on 19 MTRs, or about 65 sorties per month.

ES 3.5 Alternative Action, McChord AFB

Under the Alternative Action, the Air Force would base and operate an additional 12 C 17 aircraft at McChord AFB, ultimately increasing the total number of C-17 aircraft at the Base to 60 aircraft. A net increase of 631 Air Force active duty, reserve, and civilian personnel authorizations would occur as a result of the action, increasing the Base workforce to 10,481 persons. McChord C-17 aircrews would use nine MTRs currently scheduled and coordinated by the Base for low-level navigation training. Assault landing operations and other practice instrument approaches, takeoffs, and landings would be accomplished at the Grant County Airport, the airfield McChord AFB aircrews currently use for these operations. Sixteen facility construction, addition, and alteration projects would occur to support basing and operation activities. The basing action would begin with facility construction projects in FY03 and be complete in FY07 upon arrival of the 12th additional C-17 aircraft.

Approximately 3,456 training sorties would be flown annually from McChord AFB by the 60 assigned C-17 aircraft. It is estimated that about 1,404 annual C-17 mission sorties would be flown where the aircraft depart the Base for a worldwide airlift mission that supports the national military strategy. About 27,418 annual C-17 airfield operations (76.16 daily operations) would occur at McChord AFB, and the total annual operations for based and transient aircraft would be approximately 38,464 (106.85 daily operations). McChord AFB C-17 aircrews would accomplish about 51,569 annual operations at the Grant County Airport, or 143.11 daily operations. C-17 aircrews would fly about 3,520 annual sorties on nine MTRs, or about 294 sorties per month.

ES 4 Description of Past and Reasonably Foreseeable Future Actions

A cumulative impact, as defined by the Council on Environmental Quality (CEQ) (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

ES 4.1 Travis AFB

Travis AFB staff identified 18 other past and reasonably foreseeable actions that would occur concurrently with the Proposed Action. All 18 actions include facilities construction. Approximately 206 military and civilian personnel would relocate to Travis AFB under two of the actions. One of the actions includes relocation of Coast Guard C-130 aircraft to the Base. About 4,068 annual C-130 airfield operations (11.15 daily operations) would occur at Travis AFB, and the total annual operations for based and transient aircraft would be approximately 77,929 (241.29 daily operations).

ES 4.2 McChord AFB

McChord AFB staff identified six other past and reasonably foreseeable actions that would occur concurrently with the Alternative Action. All six actions include facilities construction. No personnel would relocate to the Base under any of the actions nor would any of the actions include airfield operations.

ES 5 Scope of the Environmental Review

C-17 aircrews are required to maintain proficiency in assault landing operations accomplished on an assault landing zone (ALZ). There are no ALZs within a reasonable proximity to Travis AFB. As a result, an ALZ needs to be identified. However, a location for the ALZ has yet to be determined. Due to lack of availability of complete information, proposed construction of an ALZ will undergo analysis for decision-making at a later time. In this particular case, the basing of C-17s at an active duty west coast Air Force base is ripe for decision. However, the decisions to identify, operate, and support an ALZ for the Proposed Action have not been resolved at this time. As a result, analyses specific to the proposed ALZ for the Proposed Action will be presented in a separate National Environmental Policy Act (NEPA) document that will include an analysis of cumulative impacts of the entire Proposed Action (32 CFR 989.10). Analyses and impacts of assault landing operations at Grant County Airport are representative of the analyses that will be accomplished when an ALZ is identified and assessed for the Proposed Action. Additionally, Grant County Airport, Moses Lake, Washington, the airfield McChord AFB aircrews currently use and would continue to be used for assault landing operations under the Alternative Action, may be used for these operations by Travis AFB aircrews until an ALZ is identified and assessed for the Proposed Action.

The action to base and operate 48 C-17 aircraft at McChord AFB was assessed in an EA entitled *Proposed C-17 Beddown, McChord Air Force Base, Washington, January 1997* (McChord AFB C-17 Beddown EA). The FONSI for the action was signed March 3, 1997. The EA assessed McChord AFB and Grant County Airport (which has an ALZ), as well as the MTRs and drop zones that McChord AFB C-17 aircrews use for low-level navigation and air drop training. The Proposed Action airspace and airfield operations, noise, and air quality conditions from the McChord AFB C-17 Beddown EA for the Base and the Grant County Airport, as well as the Proposed Action MTR operations, are used as the baseline for those resources under the Alternative Action in this EA.

No airdrop training would occur because the C-17 aircrews associated with the 12 C-17 aircraft that would be based at a west coast location would not be required to be proficient in air drop operations. Therefore, no airdrop training would occur under either the Proposed Action or Alternative Action. McChord AFB does have an airdrop requirement for some of its C-17 aircrews; however, the Alternative Action would not increase the number of airdrop operations Base aircrews accomplish above that assessed in the McChord AFB C-17 Beddown EA. For these reasons, airdrop operations are not assessed in this EA for either the Proposed Action or Alternative Action.

This EA does not assess the basing and operation of C-5 aircraft at the military installation slated to receive the aircraft transferred from Travis AFB. The gaining installation would be responsible for the environmental impact analysis process (EIAP) actions associated with receiving and operating the aircraft. Likewise, this EA does not assess any other actions that would be implemented under the airlift Mobility Transformation Plan. The military installation(s) affected by the specific actions under the Plan would be responsible for the EIAP.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the president on February 11, 1994. The EO requires each federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Based on analysis conducted for this EA, it is determined that activities associated with the Proposed Action, Alternative Action, and No Action Alternative would not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects would occur to minority and low-income populations.

ES 6 Comparison of Environmental Effects of all Alternatives

Table ES-1 at the end of this section summarizes environmental impacts from the Proposed and Alternative Actions, as well as the No Action Alternative.

Numerous construction projects would be accomplished under either the Proposed Action or Alternative Action. The construction contractor for either action would prepare and implement a Storm Water Pollution Prevention Plan to ensure compliance with the Clean Water Act to ensure water quality is not degraded. The Air Force would coordinate a Clean Water Act Section 404/401 permit with the U.S. Army Corps of Engineers for the Ragsdale Street realignment project under the Proposed Action. The project also would be coordinated with the USFWS and the National Marine Fisheries Service (NMFS).

The Proposed Action would construct a facility adjacent to Bldgs. 810 and renovate Bldg. 1212. Both structures are potentially eligible for inclusion in the National Register of Historic Places as a Cold War Resource. Design, construction, and renovation would be conducted in accordance with the Travis AFB Cultural Resources Management Plan in consultation with the California State Historic Preservation Office.

As part of the Proposed Action to realign Ragsdale Street, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset potential adverse effects to vernal pools from the road realignment.

ES 7 Identification of the Preferred Alternative

The preferred alternative is the Proposed Action which includes: basing 12 C-17 aircraft at Travis AFB; relocating 16 C-5 aircraft to another installation; using 19 MTRs for low-level navigation training; decreasing the number of personnel authorizations by 161 positions; and constructing 16 facilities projects at the Base.

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Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Air Quality)	**Travis AFB**. The greatest increase for any of the criteria air pollutants would be 1,483.211 tons per year (tpy) for nitrogen oxides (NO_x), which equates to 0.6271 percent of the baseline emissions within the air quality control region (AQCR). The CAA General Conformity Applicability Analysis prepared in June 2003 concluded that the net change in emissions for criteria pollutants would not be regionally significant, would not exceed *de minimis* thresholds, and that a Conformity Determination would not be required. **MTRs**. Emissions from C-17 operations on the MTRs within the affected AQCRs and air basins would not be regionally significant.	**McChord AFB**. The greatest increase in emissions would be NO_x (861.855 tpy) from recurring aircraft operations, which equates to 10.7732 percent of the NO_x emissions within the AQCR. Although the NO_x emissions in the AQCR exceed 10 percent of the baseline for the pollutant, the exceedance is slight. Additionally, the AQCR is in attainment for NO_x. The emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. The air emission impacts from the activities associated with the Alternative Action would not be considered significant and a Conformity Determination would not be required. **Grant County Airport**. The greatest increase in emissions would be NO_x (1,884.0 tpy) from recurring aircraft operations, which equates to 102.9508 percent of the NO_x emissions within the AQCR. The AQCR is in attainment for NO_x; thus; the emissions would not be regionally significant. The emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. **MTRs**. Emissions from C-17 operations on the MTRs within the affected AQCRs would not be regionally significant.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Noise	**Travis AFB**. The number of people exposed to Community Noise Equivalent Level (CNEL) 60 decibels (dBA) and greater would decrease by 15 percent. It is anticipated there would be a corresponding decrease in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption should decrease due to the lower aircraft-produced noise at the schools and the fewer overflights due to the reduction in airfield operations. Construction noise would be temporary, would occur only during daytime, and would cease when the project is completed. **MTRs**. The L_{dnmr} would range from a low of 36 dBA to a high of 62 dBA on the 19 MTRs, with the maximum increase being 4 dBA on one route. Noise from MTR operations would not exceed the level at which residential and other noise-sensitive land uses would be unacceptable. The hearing loss, speech interference, sleep disruption, and non-auditory health effects discussions for Travis AFB apply. No structural damage would be expected from C-17 operations on an MTR.	**McChord AFB**. An additional 510 people (14 percent) would be exposed to Day-Night Average Sound Level (DNL) 65 dBA and greater. The density in the additionally exposed area would be 2.77 persons per acre, a density that is consistent with adjacent residential areas exposed to aircraft noise under the current condition. It is anticipated there would be a corresponding increase in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption would increase due to the increased aircraft-produced noise at the schools and the greater overflights due to the increase in airfield operations. Construction noise would be temporary, would occur only during daytime, and would cease when the project is completed. **Grant County Airport**. The number of people exposed to DNL 65 dBA and greater would increase by 14 percent (3 persons). It is anticipated there would be a corresponding increase in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption should increase due to the increased aircraft-produced noise at the schools and the greater overflights due to the increase in airfield operations. **MTRs**. The L_{dnmr} would range from a low of 50 dBA to a high of 60 dBA on the nine MTRs, increasing 1 dBA on each route. Noise from MTR operations would not exceed the level at which residential and other noise-sensitive land uses would be unacceptable. The hearing loss, speech interference, sleep disruption, and non-auditory health effects discussions for McChord AFB apply. No structural damage would be expected from C-17 operations on an MTR.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Hazardous Wastes, Hazardous Materials, and Stored Fuels	The contractor would comply with all regulatory guidance for the use and disposal of hazardous materials and wastes during construction activities. The primary waste producing processes would continue to include aircraft parts cleaning, fluid changes for routine aircraft and vehicle maintenance, aircraft corrosion control, facility, and infrastructure maintenance. It is not anticipated any new hazardous materials would be needed. Hazardous material procurement and hazardous waste generation could decrease by about six percent, respectively. The existing hazardous materials handling and hazardous waste disposal processes and procedures would accommodate the activities associated with C-17 operation and maintenance. It is anticipated that the amount of fuel needed for operations would decrease by six percent.	The Proposed Action Summary applies, except that hazardous material procurement and hazardous waste generation could increase by 25 percent due to the increase from 48 to 60 assigned aircraft. Although the additional 12 aircraft would increase the need for fuel, the Base fuels storage and dispensing system has the capacity to accommodate the additional fuel requirement.	No significant impacts occur from the baseline activities.
Water Resources	The construction contractor would prepare and use a storm water pollution prevention plan with erosion control and spill control measures to minimize the potential for surface and groundwater quality degradation. The amount of impervious cover would increase by about 1.4 percent, which could result in a corresponding increase in storm water runoff. The box culverts associated with the Ragsdale Street relocation would be constructed in accordance with design standards for floodplains and associated Section 404 permit requirements.	The construction contractor would prepare and use a storm water pollution prevention plan with erosion control and spill control measures to minimize the potential for surface and groundwater quality degradation. The amount of impervious cover would increase by about 0.4 percent, which could result in a corresponding increase in storm water runoff. No facilities construction would occur in a floodplain.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Biological Resources	**Travis AFB**. Design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the National Marine Fisheries Service to avoid affecting downstream riparian/aquatic habitat quality. Work within the wetlands and in the Union Creek channel would require Section 404/401 permits from the U.S. Army Corps of Engineers. Realigning Ragsdale Street will result in direct impact to two vernal pools and indirect impact to an additional vernal pool. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force will purchase approximately 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment. **MTRs**. MTR overflights would be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.	**McChord AFB**. Construction activities would occur within developed, maintained areas with extant, highly modified and disturbed landscape, and would not substantially change habitat for plant or animal species. No endangered, threatened, or special status species are documented in the construction areas. No activities would occur within a wetland. **MTRs**. MTR overflights would be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.	No significant impacts occur from the baseline activities.
Socioeconomic Resources	There would be a decrease in the local and regional population of 364 (0.07 percent of the statistical area) as a result of the loss of 161 positions. It is anticipated that approximately 175 housing units (0.1 percent of the statistical area) would become vacant with the loss of personnel, with approximately one-half of these units being on-Base and one-half being off-Base. There would be an enrollment decrease of approximately 112 children in local schools (2.2 percent in the district nearest the base). Employment generated by construction activities would result in wages paid, and expenditures for local and regional services and supplies during construction. The reduction of 161 personnel authorizations would result in a loss in wages paid, business sales, and income to the local and regional economy.	There would be an increase in the local and regional population of 1,500 (0.214 percent of the statistical area) as a result of a net gain of 631 positions. The current housing and apartment supply is more than adequate to accommodate the demand for approximately 600 housing units. Enrollment of the anticipated 430 additional students in the district nearest the Base would increase enrollment by three percent. However, some of the other school districts within the county would absorb some of this enrollment increase. Employment generated by construction activities would result in wages paid, and increase expenditures for local and regional services and supplies during construction. The addition of 631 personnel authorizations would result in an increase in wages paid, business sales, and income to the local and regional economy.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Cultural Resources	The Proposed Action would not result in impacts to archaeological resources on Travis AFB. The Proposed Action would result in construction of a facility adjacent to Bldgs. 810 and renovations to Bldg. 1212, both NRHP-eligible properties on Travis AFB. Design, construction and renovation would be conducted in accordance with the Travis AFB CRMP and in consultation with the California SHPO. Impacts to historic resources would be avoided. **MTRs**. Impacts to cultural resources would not occur because the maximum noise from a C-17 is below the level at which vibration impacts would be anticipated. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2 and replied to four responses from Native American groups concerning the proximity of their reservation to MTRs. As a result of the response from the Karuk Tribe of California and subsequent consultation, the Air Force coordinated with the Navy as the MTR originating/scheduling activity to establish overflight avoidance areas of 3 miles and not lower than 1,500 feet AGL for two sites along VR-1250 where sacred ceremonies are conducted in the summer months. The other three responses were resolved by the Air Force's answer.	The Alternative Action would not result in impacts to archaeological or historic resources on Travis AFB. Cultural resources impacts within the MTR corridors is the same as that described for the Proposed Action. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Land Use	**Travis AFB**. Facility construction would be consistent with existing and future land use plans and programs identified in the Travis AFB General Plan. The landfill located in the southwest accident potential zone I would continue to be incompatible with Air Force Air Installation Compatible Use Zone (AICUZ) recommendations. No additional land use incompatibilities would be anticipated. **MTRs**. No significant impacts to sensitive land uses would occur because of the slight increase (L_{dnmr} 4 dBA on one route) in noise levels or the additional overflights.	**McChord AFB**. Facility construction would be consistent with existing and future land use plans and programs identified in the McChord AFB General Plan. Additional exposure to DNL 65-70 dBA would occur in off-Base areas that are not currently exposed to this level of noise. Although residences are not recommended in these noise zones unless attenuation materials are installed, the number of additionally exposed residences in the DNL 65-70 dBA noise zone would be extremely small when compared to the baseline. Additionally, the condition (*i.e.*, additional residences in the DNL 65-70 dBA noise zone) would be consistent with existing land use in the area because other residences occur in these noise zones under the baseline condition. Therefore, the additional noise exposure from the Alternative Action would not be inconsistent with local land use plans. Although additional residences would be exposed to DNL 65 dBA and greater and this increase would be incompatible according to AICUZ guidance, the increases would not require the Air Force to update its current AICUZ Study according to AICUZ program guidance. **Grant County Airport**. Land use plans for the local community would not be affected. **MTRs**. No significant impacts to sensitive land uses would occur because of the slight increase (L_{dnmr} 1 dBA) in noise levels or the additional overflights.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Infrastructure and Utilities	There would be a 1.1 percent reduction in water consumption when compared to the baseline condition due to the 161 fewer personnel. Use of water for dust control equates to about 1.6 percent of system capacity. Wastewater generation would be reduced by 1.2 percent reduction when compared to the baseline condition. The 1.4 percent increase in impervious cover likely would increase flow in the storm water system. The electricity and natural gas distribution systems capacities are more than adequate to handle the 0.01 percent increase in demand for the new buildings. The disposal of construction and demolition debris equates to less than 0.004 percent of the total remaining landfill capacity. Solid waste generation by personnel would decrease slightly due to the reduction in assigned personnel. The net loss of 161 personnel (1 percent of baseline assigned personnel) would result in a very slight decrease in weekday on-Base roadway volumes.	There would be a 1.5 percent increase in water consumption when compared to the baseline condition due to the addition of 631 personnel. Use of water for dust control equates to about 4.5 percent of system capacity. Wastewater generation would increase by 0.7 percent when compared to the baseline condition. The 0.4 percent increase in impervious cover likely would increase flow in the storm water system. The electricity and natural gas distribution systems capacities are more than adequate to handle the 0.01 percent increase in demand for the new buildings. The disposal of construction and demolition debris equates to less than 0.1 percent of the total remaining landfill capacity. Solid waste generation by personnel would increase slightly due to the increase in assigned personnel. The net increase of 631 personnel (6 percent of baseline assigned personnel) would result in an increase in weekday on-Base roadway volumes.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Airspace and Airfield Operations	**Travis AFB**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, would accommodate C-17 operations, as well as the overall decrease of 12.67 average daily airfield operations. **MTRs**. Each MTR has the capacity to accommodate the additional operations and the structure for each route can support C-17 operations. The potential for conflict between aircraft operating on the MTRs as well as other civil aircraft operating in the airspace around the MTRs is low because the existing scheduling and air traffic control procedures are designed to deconflict aircraft. The probability is low that an aircraft involved in an accident at or around the Travis AFB airfield or on a MTR would strike a person or structure on the ground. The potential for bird-aircraft strikes associated with airfield operations at Travis AFB would be expected to decrease commensurate with the decrease in flying hours at the Base. It is anticipated that about 5 bird-aircraft strikes would occur annually from Travis AFB C-17 MTR operations.	**McChord AFB**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional 15.23 average daily C-17 operations. **Grant County Airport**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional 28.63 average daily C-17 operations. **MTRs**. The airspace management and procedures discussion and analysis for the Proposed Action apply to the alternative. Each MTR has the capacity to accommodate the additional operations and the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the McChord AFB and Grant County Airport airfields or on a MTR would strike a person or structure on the ground. It is estimated that about 31 bird-aircraft strikes would occur for a one-year period in the area around the airfield. It is anticipated that about 5 bird-aircraft strikes would occur annually from McChord AFB C-17 MTR operations.	No significant impacts occur from the baseline activities.

Table ES-1
Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative (*…continued*)

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Environmental Management	The activities associated with the action would be accomplished using existing directives and would not impact achieving pollution prevention goals. The demolition contractor would be responsible for asbestos containing material (ACM) and lead-based paint (LBP) removal, which would be accomplished in accordance with existing guidance. The proposed facilities would be constructed or renovated without any ACM and LBP. Facilities design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would avoid interference with any ongoing Environmental Restoration Program (ERP) investigation and remediation work and would not worsen the condition of any site. New facilities construction would not result in any substantial changes to physiographic features. No significant soils impacts would be anticipated. Construction activity would occur within an area in which the soils have been disturbed and modified by prior activities.	The summary for the Proposed Action applies to the alternative.	No significant impacts occur from the baseline activities.

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	Microgram(s) per cubic meter
°C	Celsius
15 AF	15th Air Force
21 AF	21st Air Force
446 AW	446th Airlift Wing
60 AMW	60th Air Mobility Wing
60 CES/CEV	60th Civil Engineering Squadron/Environmental Flight
62 AW	62nd Airlift Wing
ACM	Asbestos containing material
ACQR	Air quality control region
ADC	Air Defense Command
AFB	Air Force Base
AFI	Air Force Instruction
AFR	Air Force Regulation
AFRC	Air Force Reserve Command
AGE	Aerospace ground equipment
AGL	Above ground level
AHPA	Archaeological and Historic Preservation Act
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act of 1978
ALUC	Airport Land use Commission
ALZ	Assault landing zone
AMC	Air Mobility Command
AMW	Air Mobility Wing
ANG	Air National Guard
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APE	Area of Potential Effect
APZ	Accident potential zone
AQMD	Air Quality Management District
ARB	Air Reserve base
ARC	Air Reserve Command
ARPA	Archaeological Resources Protection Act
ARTCC	Air route traffic control center
BASH	Bird-Aircraft Strike Hazard
bgs	Below ground surface
BLM	Bureau of Land Management
BTU	British thermal unit
CAA	Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDOF	California Department of Finance
CDP	Census-designated place
CEDD	California Employment Development Department
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CMSA	Consolidated Metropolitan Statistical Area
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon monoxide

CSBE	California State Board of Equalization
CY	Calendar year
CZ	Clear zone
dB	Decibel
dBA	A-weighted sound level measured in decibels
DBCRC	Defense Base Closure and Realignment Commission
DGMC	David Grant Medical Center
DNL	Day-night average sound level
DoD	Department of Defense
DoDD	Department of Defense Directive
EO	Executive Order
EA	environmental assessment
EC	Environmental Compliance
EDMS	Emissions and Dispersion Modeling System
EIAP	Environmental impact analysis process
EIFS	Economic Impact Forecast System
EIR	Economic impact region
EIS	environmental impact statement
ERA	Environmental Restoration Account
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESU	Evolutionary significant unit
FAA	Federal Aviation Administration
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FONSI	Finding of no significant impact
FY	fiscal year
gpm	Gallons per minute
HAP	High Accident Potential
Hazmart	Hazardous materials pharmacy
HAZMAT	Hazardous Materials
HMMP	Hazardous Materials Management Plan
HWMP	Hazardous Waste Management Plan
HQ	Headquarters
HUD	United States Department of Housing and Urban Development
ICRMP	Integrated Cultural Resources Management Plan
IFR	Instrument Flight Rules
IFR	Instrument flight rule
INRMP	Integrated Natural Resources Management Program
IR	Instrument route
IRP	Installation Restoration Program (now known as ERP)
JLUS	Joint Land Use Study
JP-8	Aviation jet fuel
KCF	Thousand cubic feet
kWH	KiloWatt hour
LBP	Lead-based paint
lbs	Pound(s)
lbs/ft^3	Pound(s) per cubic foot
L_{dnmr}	Day-Night average A-weighted sound level
L_{max}	Maximum Sound Level
LTO	Long-Term Operations
MAP	Management Action Plan
MG	Million gallons

mg/L	Milligrams per liter
mgd	Million gallons per day
MLS	Multiple Listing Service
mm	Millimeter
MOA	Military operations area
MSL	Mean sea level
MTR	Military training route
MVA	Megavolt amperes
MW	Megawatt
N_2O	Nitrous oxide
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	Noise level reduction
NM	Nautical mile(s)
NMFS	National Marine Fisheries Service
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRHP	National Register of Historic Places
NRIS	National Register Information System
O_3	Ozone
ODFW	Oregon Department of Fish and Wildlife
ODS	Ozone-depleting substances
OSHA	Occupational Safety and Health Agency
OU	Operable unit
PL	Public law
P2	Pollution prevention
P2 MAP	Pollution Prevention Management Action Plan
Pb	Lead
PCB	Polychlorinated biphenyls
PG&E	Pacific Gas & Electric Company
PM_{10}	Particulate matter equal to or less than 10 microns in aerodynamic diameter
$PM_{2.5}$	Particulate matter equal to or less than 2.5 microns in aerodynamic diameter
PMSA	Primary metropolitan statistical area
POL	Petroleum, oil and lubricants
pph	Pounds per hour
ppm	Parts per million
PSCAA	Puget Sound Clean Air Agency
psf	Pound(s) per square foot
RAPCON	Radar approach control
RCRA	Resource Conservation and Recovery Act
ROI	Region of influence
RTV	Rational threshold value
SEL	Sound exposure level
SFBAAB	San Francisco Bay area air basin
SHPO	State Historic Preservation Office
SIP	State Implementation Plan

SO_2	Sulfur dioxide
SOC	Species of concern
SO_x	Sulfur oxides
SPCCP	Spill prevention control and countermeasures plan
SR	Slow route
SSL	Soil screening level
SUA	Special use airspace
SVOC	Semivolatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
the Airport	Grant County International Airport, Moses Lake, WA
the Base	Travis AFB or McChord AFB
the Plan	Mobility Transformation Plan
Title X	Residential Lead-Based Paint Hazard Reduction Act of 1992
tpy	Tons per year
TRACON	Terminal radar approach control
TSD	Treatment, storage or disposal
TSDF	Temporary Storage and Disposal Facility
TSP	Total suspended particulates
TUSD	Travis Unified School District
USC	United States Code
UNR	University of Nevada, Reno
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USDL	United States Department of Labor
USDOC	United States Department of Commerce
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	Volatile organic compounds
VR	Visual route
WAPA	Western Area Power Authority
WCRER	Washington Center for Real Estate Research
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WOFM	Washington Office of Financial Management
WSDR	Washington State Department of Revenue
WSESD	Washington State Employment Security Department

CHAPTER 1
PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This chapter has seven sections: an introduction, a statement of the purpose and need for the action; the objectives of the action; a summary of the scope of the environmental review; a statement of the decision that must be made; identification of applicable regulatory requirements; and an overview of the organization of the document.

1.1 INTRODUCTION

The Air Force Mobility Force Structure Briefing to Congress on April 15, 2002 presented an airlift Mobility Transformation Plan (the Plan) that proposes to standardize airlift aircraft fleets, increase reliability, lower operating and support costs, and increase airlift capability by 33 percent. The minimum airlift requirement, as determined by the Mobility Requirement Study 2005 to support the national military strategy requires the ability to airlift 54.5 million ton miles per day, while the current capability is 45.8 million ton miles. The Mobility Transformation Plan, which extends through the year 2017, would allow the Air Force to address the increasing demand for airlift with newer, more reliable aircraft and improved overall support.

A total of 53 active duty Air Force and air reserve component (ARC, *i.e.*, Air Force Reserve Command [AFRC] and Air National Guard [ANG]) military installations nationwide would be affected by the Plan outlined in the Air Force Mobility Force Structure Briefing. As part of the overall Plan, Headquarters, Air Mobility Command (HQ AMC) at Scott Air Force Base (AFB), Illinois proposes to base 12 C-17 aircraft at an active duty west coast Air Force base. Two basing options are being considered in detail:

- Travis AFB, located in Solano County, California, within the City of Fairfield, and about 50 miles northeast of San Francisco. Aircraft based at Travis AFB include the C-5, a strategic cargo transport aircraft, and the KC-10, primarily an aerial refueling aircraft that also has cargo transport capability.
- McChord AFB, located in Pierce County, Washington, adjacent to the City of Lakewood about 10 miles south of the City of Tacoma. McChord AFB is converting from C-141 to 48 assigned C-17 aircraft. It is anticipated the conversion will be complete in 2004.

Figure 1.1-1 shows the location of Travis and McChord AFBs, as well as the Grant County International Airport, Moses Lake, Washington (Grant County Airport, or the Airport). McChord AFB aircrews use the Grant County Airport for this training. It is estimated that activities associated with the basing action would begin in Fall 2003.

The C-17 aircraft combines the attributes of a strategic airlifter – long range, aerial refueling, and large payload (including outsize cargo) - with those of a tactical airlifter – agility in the air, survivability, ability to operate on austere airfields with short runways, and the ability to air drop cargo and personnel. A key capability of the C-17 aircraft is its

capability to land and take off from a short runway called an assault landing zone (ALZ) (3,500 feet or less in length).

1.2 NEED FOR ACTION

The need for the action is to base 12 C-17 aircraft at an active duty west coast Air Force base as part of the airlift Mobility Transformation Plan to improve overall airlift capability. As part of the Plan, the Air Force has determined it is operationally prudent to maintain a robust airlift capability on the west coast to contribute to the overall airlift requirement of 54.5 million ton miles per day. Specifically, basing C-17 aircraft at a west coast location would enhance the capability of the Air Force to meet the national military strategy by modernizing strategic and tactical airlift aircraft on the west coast.

1.3 OBJECTIVES FOR THE ACTION

The objective of the action is to beddown 12 C-17 aircraft and related aircrew, aircraft maintenance, and support personnel at a west coast active duty Air Force base and then operate the aircraft from that base. The aircrews would accomplish airlift missions to support the worldwide mobility commitments and fly training sorties to maintain proficiency.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

The *National Environmental Policy Act* (NEPA) of 1969, as amended, requires federal agencies to consider environmental consequences in the decision-making process. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA that include provisions for both content and procedural aspects of the required environmental analysis. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508) and 32 CFR 989 (*Air Force Environmental Impact Analysis Process*), 15 Jul 99, and amended 28 Mar 01. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The CEQ regulations require that an environmental assessment (EA):

- Briefly provide evidence and analysis to determine whether the Proposed Action might have significant effects that would require preparation of an environmental impact statement (EIS). If analysis determines that the environmental effects would not be significant, a finding of no significant impact (FONSI) will be prepared;
- Facilitate preparation of an EIS, when required; or
- Aid an agency's compliance with NEPA when no EIS is necessary.

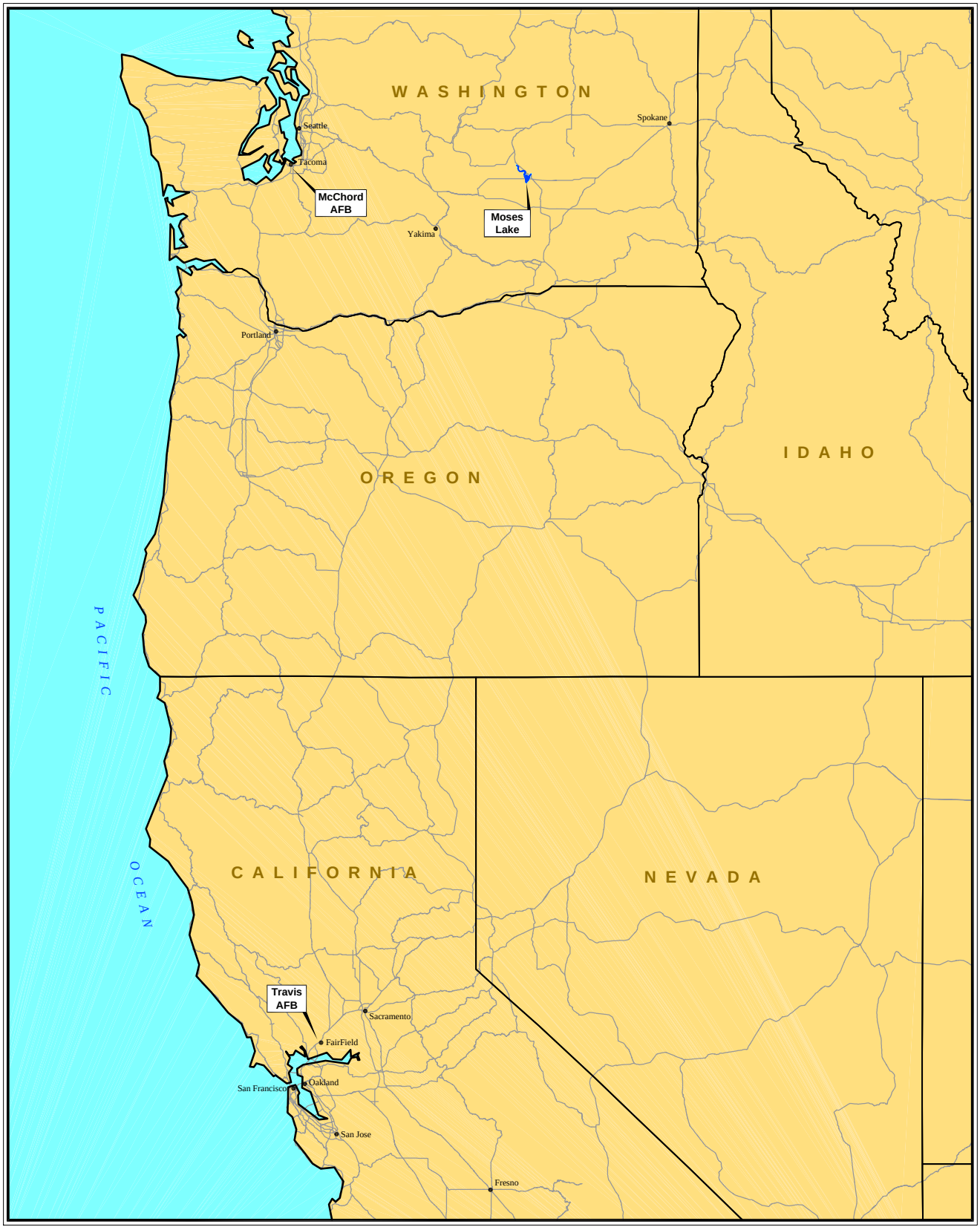


Figure 1.1-1

Location Map

Travis AFB and McChord AFB

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This EA assesses the proposed west coast basing of C-17 aircraft at either Travis AFB or McChord AFB, as well as the No Action Alternative and cumulative actions at both bases. This EA identifies, describes, and evaluates the potential environmental impacts that may result from implementation of the Proposed Action or alternative actions, as well as possible cumulative impacts from other reasonably foreseeable actions planned for the bases. The EA also identifies required environmental permits relevant to the Proposed Action and alternative actions. As appropriate, the affected environment and environmental consequences of the Proposed Action, alternative actions, and No Action Alternative may be described in terms of site-specific descriptions or regional overview. Finally, this EA identifies mitigation measures to prevent or minimize environmental impacts, if required.

The following biophysical resources are assessed in this EA: air quality; noise; hazardous wastes, hazardous materials, and stored fuels; water resources; biological resources; socioeconomic resources; cultural resources; land use; infrastructure and utilities; airspace and airfield operations; environmental management; and environmental justice.

Baseline conditions used for environmental evaluation are assumed to be fiscal year (FY) 2002, except for resources directly related to aircraft operations (*e.g.*, airspace and airfield operations, noise, and air quality). However, if FY02 data are not available, the most recent information will be used. The aircraft operations data obtained during a 2000 aircraft noise study (USAF 2000d) will be used to describe the baseline condition for airspace and airfield operations, noise, and air quality at Travis AFB for the Proposed Action.

The action to base and operate 48 C-17 aircraft at McChord AFB was assessed in an EA entitled *Proposed C-17 Beddown, McChord Air Force Base, Washington, January 1997* (McChord AFB C-17 Beddown EA) (USAF 1997). The FONSI for the action was signed March 3, 1997. The EA assessed McChord AFB and Grant County Airport (which has an ALZ), as well as the military training routes (MTR) and drop zones that McChord AFB C-17 aircrews use for low-level navigation and air drop training. The Proposed Action airspace and airfield operations, noise, and air quality conditions from the McChord AFB C-17 Beddown EA for the Base and the Grant County Airport, as well as the Proposed Action MTR operations, are used as the baseline for those resources under the Alternative Action in this EA.

It is estimated that the west coast C-17 basing would begin in FY03 and be completed in FY07. For analysis purposes, FY03 (beginning October 2002) through FY07 are assessed, by year, to represent the potential annual impacts of C-17 basing activities as well as operation after basing is complete.

C-17 aircrews are required to maintain proficiency in assault landing operations accomplished on an ALZ. There are no ALZs within a reasonable proximity to Travis AFB. As a result, an ALZ needs to be identified. However, a location for the ALZ has yet to be determined. Due to lack of available complete information, the proposed construction of an ALZ will undergo analysis for decision-making at a later time. In this particular case, basing of C-17s at an active duty west coast Air Force base is ripe for decision. However, the

decisions to identify, operate, and support an ALZ for the Proposed Action have not been resolved at this time. As a result, analyses specific to the proposed ALZ for the Proposed Action will be presented in a separate NEPA document that will include a cumulative impacts analysis of the entire Proposed Action (32 CFR 989.10). Analyses and impacts of assault landing operations at the Grant County Airport are representative of the analyses that will be accomplished when an ALZ is identified and assessed for the Proposed Action. Additionally, Grant County Airport), Moses Lake, Washington, the airfield McChord AFB aircrews currently use and would continue to use for assault landing operations under the Alternative Action, may be used for these operations by Travis AFB aircrews until an ALZ is identified and assessed for the Proposed Action.

No airdrop training would occur because the C-17 aircrews associated with the 12 C-17 aircraft that would be based at a west coast location would not be required to be proficient in air drop operations. Therefore, no airdrop training would occur under either the Proposed Action or Alternative Action. McChord AFB does have an airdrop requirement for some of its C-17 aircrews; however, the Alternative Action would not increase the number of airdrop operations Base aircrews accomplish above that assessed in the McChord AFB C-17 Beddown EA. For these reasons, airdrop operations are not assessed in this EA for either the Proposed Action or Alternative Action.

This EA does not assess the basing and operation of C-5 aircraft at the military installation slated to receive the aircraft transferred from Travis AFB. The gaining installation would be responsible for the EIAP actions associated with receiving and operating the aircraft. Likewise, this EA does not assess any other actions that would be implemented under the airlift Mobility Transformation Plan. The military installation(s) affected by the specific actions under the Plan would be responsible for the EIAP.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the president on February 11, 1994. The EO requires federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Based on analysis conducted for this EA, it is determined that activities associated with the Proposed Action, Alternative Action, and No Action Alternative would not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects would occur to minority and low-income populations.

1.5 DECISION THAT MUST BE MADE

The decision to be made by the Air Force is whether to:

- Base and operate 12 C-17 aircraft at Travis AFB and realign 16 C-5 aircraft from the Base to an ARC installation (Proposed Action);

- Base and operate an additional 12 C-17 aircraft at McChord AFB, ultimately increasing the total number of C-17 aircraft at the Base to 60 aircraft (Alternative Action); or
- Not base additional C-17 aircraft other than the 48 aircraft planned for McChord AFB at an AMC west coast military installation (No Action Alternative).

1.6 APPLICABLE REGULATORY REQUIREMENTS

Numerous construction projects would be accomplished under either the Proposed Action or Alternative Action. The construction contractor for either action would prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) to ensure compliance with Clean Water Act requirements to ensure water quality is not degraded. The Air Force would coordinate a Clean Water Act Section 404/401 permit with the U.S. Army Corps of Engineers (USACE) for the Ragsdale Street realignment project under the Proposed Action. The project also would be coordinated with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS).

The Proposed Action would construct a facility adjacent to Bldgs. 810 and renovate Bldg. 1212. Both structures are potentially eligible for inclusion in the National Register of Historic Places as a Cold War Resource. Design, construction, and renovation would be conducted in accordance with the Travis AFB Cultural Resources Management Plan and in consultation with the California State Historic Preservation Office.

1.7 ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters.

Chapter 1 Contains an introduction; a statement of the need for the action; objectives for the action; scope of the environmental review; a statement of the decision that must be made; presentation of the applicable regulatory requirements; and the organization of the EA.

Chapter 2 Has an introduction; lists the selection criteria for alternatives; describes the alternatives considered but eliminated from further consideration; details the proposed alternatives; presents information on past and reasonably foreseeable future actions; identifies the preferred alternative; and summarizes the environmental impacts for all alternatives.

Chapter 3 Contains a general description of the biophysical resources and baseline conditions that potentially could be affected by the Proposed Action, Alternative Action, or No Action Alternative.

Chapter 4 Discusses the environmental consequences.

Chapter 5 Lists preparers of this document.

Chapter 6	Lists the persons and agencies consulted in preparation of this EA.
Chapter 7	Lists the sources of the information used in preparation of this EA.
Appendix A	Air Force Form 813
Appendix B	Detailed Information on the Proposed Action MTRs
Appendix C	Interagency and Intergovernmental Correspondence for Environmental Planning
Appendix D	Clean Air Act General Conformity Applicability Analysis, West Coast Basing of C-17 Aircraft

CHAPTER 2
DESCRIPTION OF THE ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter has seven sections: introduction; listing of the selection criteria used to develop the alternatives; discussion of the alternatives eliminated from further consideration; detailed description of the proposed alternatives; descriptions of past and reasonably foreseeable future actions at Travis and McChord AFBs; identification of the preferred alternative; and comparison of the environmental impacts of all alternatives.

2.1 INTRODUCTION

The Air Mobility Command (AMC) structure has two numbered Air Forces in the continental United States. The 21st Air Force (21 AF) at McGuire AFB, New Jersey has responsibility for airlift forces east of the Mississippi River, while the 15th Air Force (15 AF) at Travis AFB has responsibility for forces west of the Mississippi. Under the current distribution of airlift aircraft, more aircraft are based on the east coast within the 21 AF area of responsibility. Basing 12 C-17 aircraft at a west coast base within the 15 AF area of responsibility would balance the airlift aircraft between the east and west coasts in both physical location and within AMC structure, as well as number of aircraft. Thus, the Air Force determined that overall airlift capability would best be improved by basing the 12 aircraft on the west coast.

2.2 SELECTION CRITERIA FOR ALTERNATIVES

The Air Force prepared selection criteria for use in developing and evaluating alternatives for basing 12 C-17 aircraft at a west coast military installation. The following summarizes the criteria:

- The military installation at which the aircraft would be based must have adequate existing facilities. If the existing facilities are inadequate, the installation must have sufficient space for construction of aircraft parking, maintenance, and operations work space, and emergency response facilities and equipment to support the safe operation of C-17 aircraft.
- The military installation at which the aircraft would be based must have an operational runway.
- It is highly desirable that the military installation at which the aircraft would be based have a Reserve Associate unit at the installation since utilization of the C-17 aircraft is increased through the Reserve Associate concept.
- The military installation at which the aircraft would be based must have an airlift mission to avoid the potential for operational incompatibilities that can occur when aircraft with dissimilar operating parameters such as large, slower airlift and small, faster fighter aircraft operate from the same runway.
- The action would not create or dissolve airlift units.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

2.3.1 Basing Alternatives

Using the criteria in Section 2.2, the Air Force developed five potential alternatives, including the No Action Alternative, for basing 12 C-17 aircraft at a west coast military installation.

2.3.1.1 Basing C-17 Aircraft at Travis AFB Alternative

Under this alternative, 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to Travis AFB. The action would also include relocating 16 of Travis AFB's C-5 aircraft to another Air Reserve Component (ARC) installation. The C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling and low-level navigation training on MTRs.

2.3.1.2 Basing C-17 Aircraft at McChord AFB Alternative

Under this alternative, an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to McChord AFB, increasing the total number of C-17s to 60 aircraft. The additional C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on MTRs, and assault landings at the Grant County Airport.

2.3.1.3 Basing C-17 Aircraft at Fairchild AFB Alternative

Under this alternative, 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to the 92nd Air Refueling Wing at Fairchild AFB, Spokane, Washington, which currently has 56 KC-135 aircraft. Fairchild AFB also hosts a Washington Air National Guard (ANG) unit that operates 10 KC-135 aircraft. The C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling, low-level navigation training on MTRs, and assault landings at the Grant County Airport.

2.3.1.4 Basing C-17 Aircraft at March Air Reserve Base Alternative

Under this alternative, an additional 12 C-17 aircraft and associated aircrews and aircraft maintenance personnel would be assigned to March Air Reserve Base (ARB), Riverside, California. The C-17 aircrews would fly worldwide airlift missions as well as training sorties that include air refueling and low-level navigation training on MTRs. The 452nd Air Mobility Wing Air Force Reserve Command (AFRC) at the ARB is projected to convert from C-141 and KC-135 aircraft to C-17 aircraft.

2.3.1.5 No Action Alternative

Under the No Action Alternative, AMC would continue to operate its current west coast airlift fleet until aircraft are retired or realigned because of age.

2.3.2 Summary of Alternatives Consideration Processes

The Air Force evaluated each potential alternative using the criteria in Section 2.2. The following paragraphs summarize evaluation of each alternative.

2.3.2.1 Basing C-17 Aircraft at Travis AFB Alternative

The alternative meets all the criteria identified in Section 2.2.1 and will be considered in detail in the EA.

2.3.2.2 Basing C-17 Aircraft at McChord AFB Alternative

The alternative meets all the criteria identified in Section 2.2.1 and will be considered in detail in the EA.

2.3.2.3 Basing C-17 Aircraft at Fairchild AFB Alternative

Although Fairchild AFB is an AMC Base, it has an air refueling mission, not an airlift mission. Additionally, the Base does not have a Reserve Associate program. Under the Reserve Associate program, the active duty unit possesses and operates the aircraft. Aircrews from the Reserve Associate unit operate the active duty aircraft on worldwide airlift and local training missions as do the active duty aircrews. Spokane is not a large population center and likely could not support a Reserve Associate program in addition to the existing ANG unit. To obtain the desired increased airlift capability from the 12 C-17 aircraft, a Reserve Associate program would have to be established at the Base, thereby conflicting with the criterion that no units would be established. For these reasons, this alternative was eliminated from further consideration.

2.3.2.4 Basing C-17 Aircraft at March Air Reserve Base Alternative

The Air Force Chief of Staff issued a policy message on February 23, 1994 concerning retention of an active duty presence at bases closed or realigned as a result of the 1993 Defense Base Closure and Realignment Commission's (DBCRC) report to the President of the United States. Air Force major commands such as AMC had requested authority to establish new missions or substitute missions at bases recommended for closure or realignment in the 1993 report. The requests included establishing a new active duty presence or transferring an active mission to the ARC remaining at a realignment installation. To ensure the major commands understood the requirements set forth in the closure law, the following was provided in paragraph 3A of the policy message:

"Where the DBCRC's recommendations identified which major units would be allowed to remain and operate at installations designated for realignment, only those major units and missions that are specifically identified and approved in the DBCRC's report will be allowed to operate at these bases. No new missions, substitute missions, or other contingencies requiring full time active duty presence will be allowed."

This alternative was eliminated from further consideration because the C-17 unit that would be based at March ARB would be an active duty unit and would, thereby, conflict with the policy established by the Air Force Chief of Staff.

2.3.2.5 No Action Alternative

The Air Force EIAP (32 CFR 989.8(d)) states: "…except in those rare instances where excused by law, the Air Force must always consider and assess the environmental impacts of the 'no action' alternative." The No Action Alternative relative to the action that will be assessed in the EA would not be excused by law. Therefore, the No Action Alternative will be assessed in the EA.

2.4 DESCRIPTION OF PROPOSED ALTERNATIVES

2.4.1 No Action Alternative

Under the No Action Alternative, AMC would continue to operate its current west coast airlift aircraft fleet until aircraft are retired from service because of age or realigned to another installation. No additional C-17 aircraft other than the 48 aircraft planned for McChord AFB would be based at an AMC west coast military installation.

2.4.1.1 No Action Alternative, Travis AFB

Travis AFB would continue to provide airlift support for the national military strategy by operating 37 C-5 and 27 KC-10 aircraft. The number of Air Force active duty, reserve, and civilian personnel authorizations, as well as contractor personnel at the Base, would remain at the current levels (14,357 personnel). Likewise, C-5 and KC-10 sorties, as well as airfield operations, would continue at present levels. Travis AFB C-5 aircrews would continue to fly about 1,577 annual mission and training sorties, while there would be about 2,270 annual KC-10 sorties. Mission sorties are flown 365 days per year, while training sorties typically occur 335 days per year. Table 2.4.1-1 lists the average daily and annual airfield operations for the baseline condition at Travis AFB. No MTR operations would occur since Travis AFB aircrews do not have a training requirement for low-level navigation training.

Table 2.4.1-1 Annual and Average Daily Airfield Operations, Baseline, Travis AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
C-5	2,454	6.72	22,627	76.70	25,081	83.42
KC-10	5,439	14.90	26,450	89.66	31,889	104.56
Navy E-6	1,236	3.38	3,066	8.40	4,302	11.78
Aero Club	5,008	13.72	2,102	5.76	7,110	19.48
Transient	6,960	19.05	1,650	4.52	8,610	23.57
Total	21,097	57.77	55,895	185.04	76,992	242.81

Note: Approximately 13 percent of the operations occur during the evening (7:00 p.m. to 10:00 p.m.), while 9 percent occur during nighttime (10:00 p.m. to 7:00 a.m.). Aero club operations occur on a runway dedicated to aero club aircraft about 2 miles west of the Travis AFB primary runways. Table 3.1.11-1 lists the operations for transient aircraft.

Source: USAF 2000d.

Throughout this document, three terms are used to describe flying operations: sortie, airfield operation, and sortie operation. Each has a distinct meaning commonly applied to a specific set of activities in particular airspace areas.

A sortie is a single military aircraft flight from initial takeoff through final landing.

An airfield operation is the single movement or individual portion of a flight in the airfield airspace environment, such as one departure (takeoff), one arrival (landing), or one transit of the airport traffic area. The airfield airspace environment typically is referred to as the airspace allocated to the air traffic control tower and includes the airspace within an approximate 5-mile radius of the airfield and up to 2,500 feet above ground level (AGL). A low approach or a missed approach consists of two airfield operations, *i.e.,* one arrival and one departure. A closed pattern consists of two airfield operations (*i.e.,* one takeoff and one landing accomplished as a touch and go). The minimum number of airfield operations for one sortie is two operations, one takeoff (departure) and one landing (arrival).

A sortie aircraft operation is defined as the use of one airspace unit (*e.g.*, military operations area, restricted area, MTR, or radar approach control airspace) by one aircraft. A sortie aircraft operation applies to flight activities outside the airfield airspace environment. Each time a single aircraft conducting a sortie operates in a different airspace unit, one sortie operation is counted for that unit.

2.4.1.2 No Action Alternative, McChord AFB

McChord AFB would provide airlift support for the national military strategy by operating the 48 C-17 aircraft scheduled for the Base when the basing action assessed in the McChord AFB C-17 Beddown EA is completed in FY04. The number of Air Force active duty, reserve, and civilian authorizations, as well as contractor personnel at the Base, would remain at the levels anticipated and assessed in the McChord AFB C-17 Beddown EA (9,850 personnel). Likewise, C-17 sorties, as well as airfield, MTR, and airdrop operations, would occur at the levels assessed in the McChord AFB C-17 Beddown EA. McChord AFB aircrews would fly about 3,645 annual sorties. Mission sorties are flown 365 days per year,

while training sorties typically occur 360 days per year. Table 2.4.1-2 lists the average daily and annual airfield operations for the baseline condition at McChord AFB, and Table 2.4.1-3 presents data for the Grant County Airport. Table 2.4.1-4 presents the annual and monthly MTR operations for the baseline and Figure 2.4.1-1 depicts the routes. No C-17 specific facility construction other than that assessed in the McChord AFB C-17 Beddown EA would occur.

Table 2.4.1-2 Annual and Average Daily Airfield Operations, Baseline, McChord AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
C-17	9,626	26.74	12,306	34.19	21,932	60.93
Transient	5,034	13.98	6,014	16.71	11,048	30.69
Total	14,660	40.72	18,320	50.90	32,980	91.62

Note: The C-17 airfield operations are the total operations associated with the mission and training sorties for 48 assigned aircraft. Approximately 19 percent of the operations occur during nighttime (10:00 p.m. to 7:00 a.m.). Table 3.2.11-1 lists the operations for transient aircraft.

Source: USAF 1997.

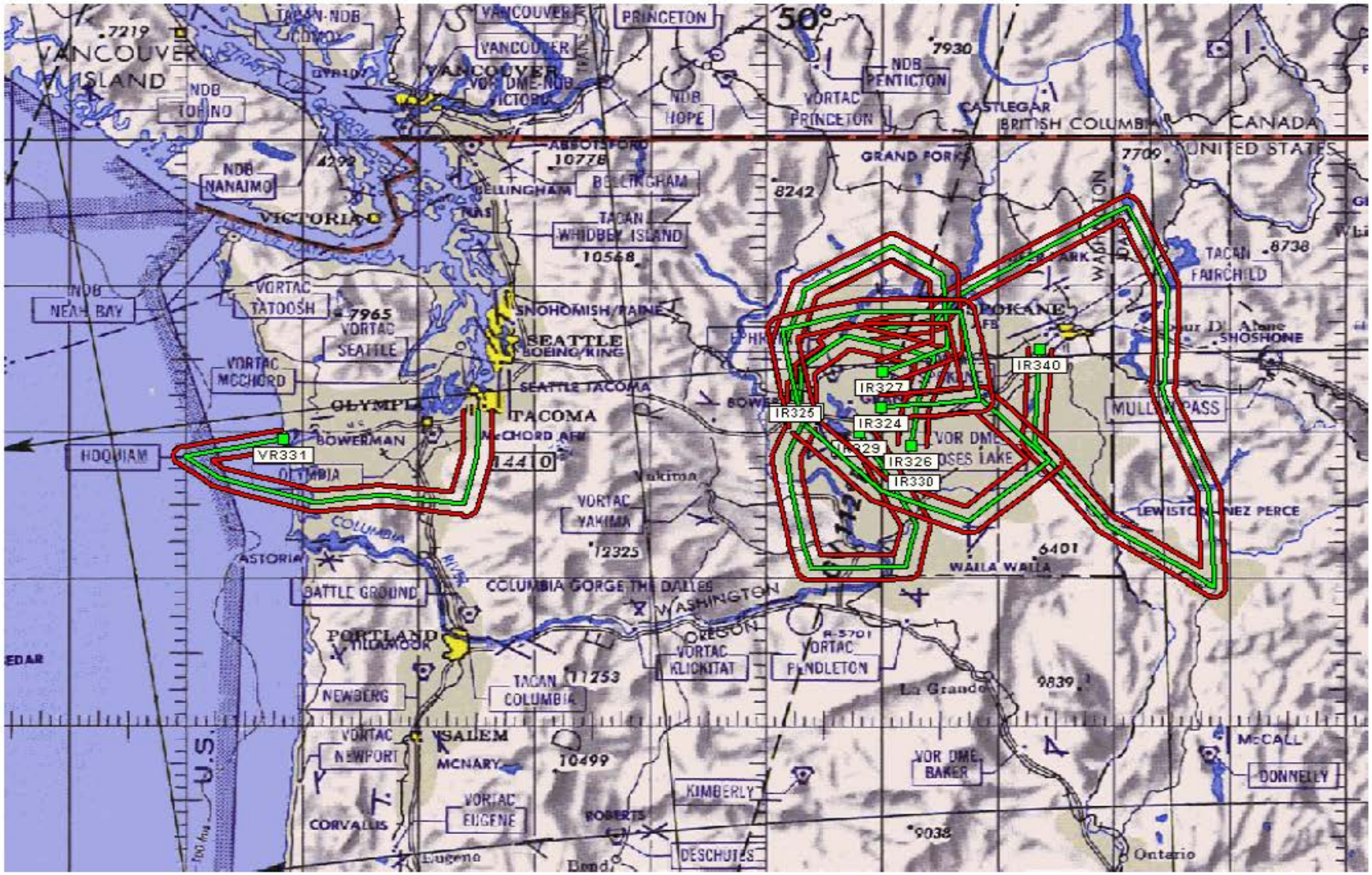
Table 2.4.1-3 Annual and Average Daily Airfield Operations, Baseline, Grant County Airport

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
C-17	427	1.16	1,605	4.40	2,032	5.56
C-17 ALZ	7,845	21.78	31,378	87.14	39,223	108.92
C-17 Subtotal	8,272	22.94	32,983	91.54	41,255	114.48
Other Military	1,625	4.62	6,504	17.98	8,129	22.60
Civil Training	6,249	17.84	28,470	78.79	34,719	96.63
Air Taxi	5,319	14.70	0	0.00	5,319	14.70
General Aviation	17,154	47.66	44,070	122.34	61,224	170.00
Total	38,619	107.76	112,027	310.65	150,646	418.41

Note: The C-17 airfield operations are the training operations associated with 48 assigned aircraft. Approximately 3 percent of the operations occur during nighttime (10:00 p.m. to 7:00 a.m.). Table 3.2.11-2 details the operations for the other military, civil training, air taxi, and general aviation categories.

Source: USAF 1997.

Figure 2.4.1-1 Military Training Routes, Alternative Action, McChord AFB



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Table 2.4.1-4 C-17 Military Training Route Operations, Baseline, McChord AFB

	Operations	
Route	**Annual**	**Monthly**
IR-324/325	768	64
IR-326	256	21
IR-327/328	768	64
IR-329	256	21
IR-330	256	21
IR-340	512	43
VR-331	384	32
Total	3,200	266

Note: C-17 MTR operations are the total operations for 48 assigned aircraft. IR-325 is the reverse of IR-324. IR-328 is the reverse of IR-327. Thus, the operations for IRs 324 and 325 and IRs 327 and 328 are respectively combined. Monthly operations are rounded to the nearest whole number. Approximately 19 percent of the C-17 MTR operations would occur during nighttime (10:00 p.m. to 7:00 a.m.). Other aircraft types such as C-130s fly IRs 324 through 330 about two times per month for each route (25 annually for each route), while EA-6 aircraft fly IR-340 about two times per month (24 annual) and VR-331 about 21 times per month (250 annual).

Source: USAF 1997.

2.4.2 Proposed Action, Travis AFB

Based on the process described in Sections 2.1 though 2.3, the Air Force would base and operate 12 C-17 aircraft at Travis AFB and realign 16 C-5 aircraft from the Base to an ARC installation, leaving 21 C-5 aircraft at the Base. The number of C-5s would steadily draw down as the number of C-17s increased. The number of assigned KC-10 aircraft would not be affected by the action and would remain at 27 aircraft, with the assigned C-17s, C-5s, and KC-10s totaling 60 aircraft. A net loss of 161 Air Force active duty, reserve, and civilian personnel authorizations would occur as a result of the action, decreasing the Base workforce to 14,196 persons. Travis AFB C-17 aircrews would use 19 MTRs, all of which could be used for low-level navigation training. Sixteen facility construction, addition, and alteration projects would occur to support basing and operation activities. The basing action would begin in FY03 with facility construction projects and be complete in FY07 with the arrival of the 12th C-17 aircraft.

2.4.2.1 Airfield and Military Training Route Operations

A typical C-17 training sortie would include a departure, an air refueling, an MTR, and return to Travis AFB. Aircrews would practice takeoffs, landings, instrument approaches and departures, low and missed approaches, and touch and go landings and takeoffs at the Base before sortie termination. Approximately 778 training sorties would be flown annually from Travis AFB by the 12 assigned C-17 aircraft. The annual and average daily airfield operations for Travis AFB for the Proposed Action are listed in Table 2.4.2-1. It is estimated that about 315 annual C-17 mission sorties would be flown where the aircraft depart the Base for a worldwide airlift mission that supports the national military strategy. The number of

projected C-5 sorties and airfield operations would be about 67 percent of the current levels. There would be no anticipated change in the level of KC-10 activity.

Table 2.4.2-1 Annual and Average Daily Airfield Operations, Proposed Action, Travis AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	Annual	Avg. Daily	Annual	Avg. Daily	Annual	Avg. Daily
C-17	2,184	6.17	4,807	13.73	6,991	19.90
C-5	1,642	4.50	15,159	51.39	16,801	55.89
KC-10	5,439	14.90	26,450	89.66	31,889	104.56
Navy E-6	1,236	3.38	3,066	8.40	4,302	11.78
Aero Club	5,008	13.72	2,102	5.76	7,110	19.48
Transient	5,644	15.45	1,124	3.08	6,768	18.53
Total	21,153	58.12	52,708	172.02	73,861	230.14

Note: Approximately 14 percent of the operations occur during the evening (7:00 p.m. to 10:00 p.m.), while 11 percent occur during nighttime (10:00 p.m. to 7:00 a.m.). Aero club operations occur on a runway dedicated to aero club aircraft about 2 miles west of the Travis AFB primary runways. Table 3.2.11-1 lists the specific operations for the transient aircraft.

Travis AFB C-17 aircrews would accomplish low-level navigation training on 19 existing MTRs that are scheduled and coordinated by Air Force, Navy, and ANG units at other Air Force bases and military installations in California. Table 2.4.2-2 lists the routes and the proposed number of annual and monthly C-17 operations for each route. There are three types of MTRs. Routes flown using Instrument Flight Rules (IFR) procedures (IR routes) allow aircraft to operate below 10,000 feet above mean sea level (MSL) at speeds in excess of 250 knots (288 mph) along Department of Defense (DoD)/Federal Aviation Administration (FAA) mutually developed and published routes in IFR conditions. Routes flown using Visual Flight Rules (VFR) procedures (VR routes) are guided by the same restrictions as IR routes but are limited to VFR conditions. Slow Routes (SR) are slow speed low altitude training routes that operate below 1,500 feet above ground level (AGL) at airspeeds of 250 knots or less. Figure 2.4.2-1 depicts the IRs; Figure 2.4.2-2 shows the VRs; and Figure 2.4.2-3 presents the SRs that Travis AFB aircrews would use. MTRs are defined along a route centerline with boundaries that parallel the centerline on each side. The boundaries for the routes considered for the Proposed Action extend to distances as great as 10 miles from the centerline. The term MTR corridor as used in this EA includes the airspace and ground surface between the route boundaries.

2.4.2.2 Construction and Building Addition/Alteration Projects

The Air Force would accomplish 16 construction and building addition/alteration projects to support beddown of C-17 aircraft and ensuing operation at Travis AFB. Table 2.4.2-3 lists the size of the project in square feet as well as the estimated start dates and project durations. The location number in the table corresponds to the project location on Figure 2.4.2-4. The following paragraphs briefly describe the construction actions.

Table 2.4.2-2 Military Training Route Operations, Proposed Action, Travis AFB

	Operations	
Route	**Annual**	**Monthly**
IR-203	62	5
IR-207/208	62	5
VR-202	62	5
VR-249	62	5
VR-1205	62	5
VR-1215	62	5
SR-300/301	122	10
SR-311/359	86	7
IR-212	26	2
IR-236	26	2
VR-201	26	2
VR-208	24	2
VR-1250	26	2
VR-1252	26	2
VR-1254	26	2
SR-381	24	2
Total	784	63

Note: Travis AFB intends to request the unit responsible for scheduling and coordinating IR-207 to take the actions necessary to establish IR-208. IR-208 would have an identical route structure as IR-207, but would be flown in the opposite direction. SR-300 is reverse of SR-301, and SR-311 is the reverse of SR-359. Thus, the use data for the routes are combined as indicated in the table. Additionally, Travis AFB intends to request the unit responsible for scheduling and coordinating SRs-300 and 301 to take the actions necessary to establish the routes as IRs. This action would allow flying the routes at airspeeds in excess of 250 knots and at altitudes greater than 1,500 feet AGL, and the routes are assessed accordingly. The Air Force has requested that the unit responsible for scheduling and coordinating VR-1250 establish overflight avoidance areas of 3 miles and not lower than 1,500 feet AGL for two sites along VR-1250 where a Native American Tribe conducts sacred ceremonies during the summer months. Monthly operations are rounded to the nearest whole number. Approximately 14 percent of the MTR operations occur during the evening (7:00 p.m. to 10:00 p.m.), while 11 percent occur during nighttime (10:00 p.m. to 7:00 a.m.).

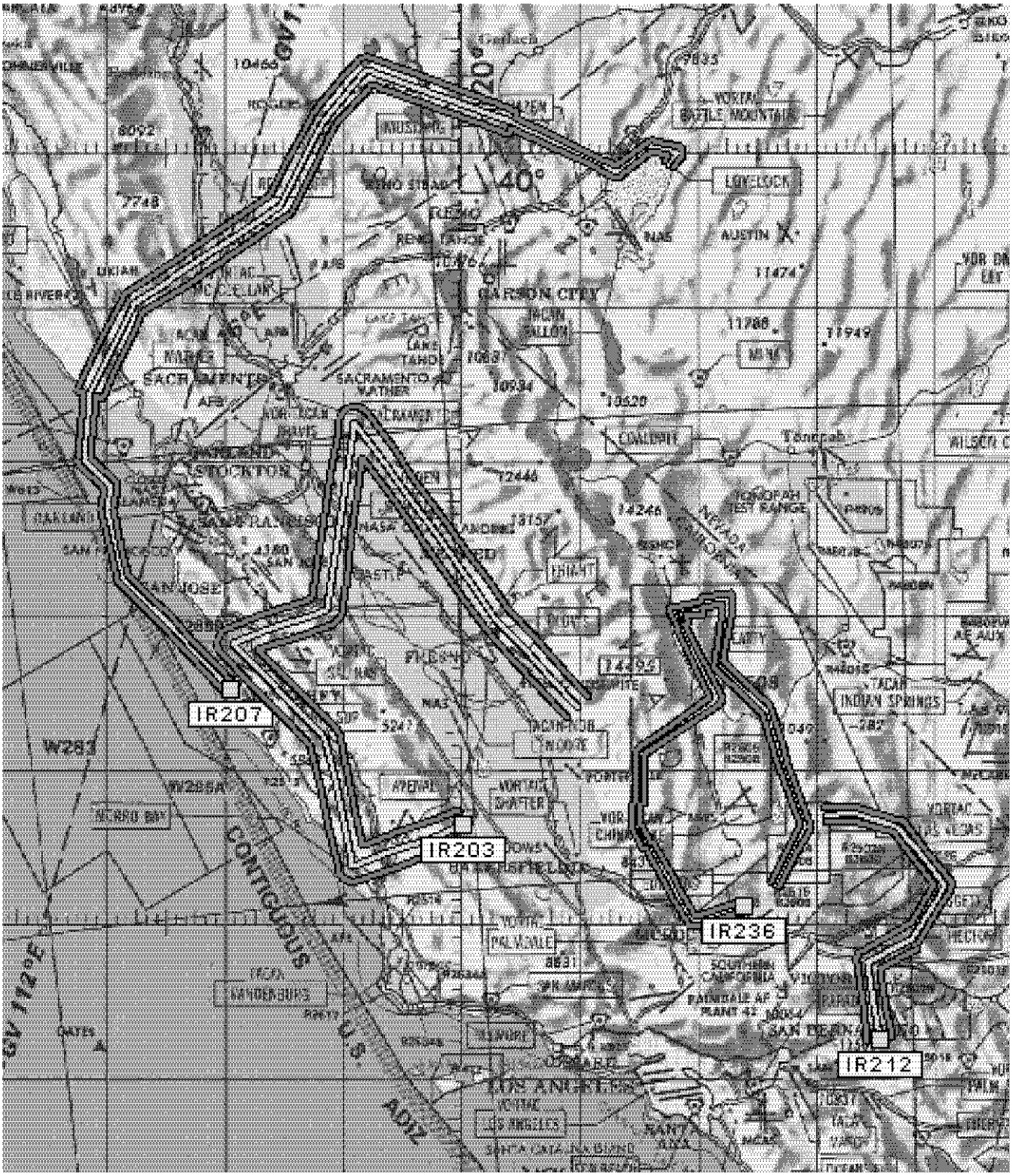
Table 2.4.2-3 Construction Project Information, Proposed Action, Travis AFB

Project	Location Number	Size (Square Feet)	Start Date	Duration
C-17 Flight Simulator Facility	1	13,750	03	18 months
C-17 Maintenance Training Facility	2	41,750	06	25 months
C-17 Aerospace Ground Equipment Facility	3	33,400	06	18 months
C-17 Aircraft Parts Store	4	60,000	03	18 months
C-17 Two-Bay Hangar	5	92,210	07	25 months
C-17 Nose Dock	6	29,760	06	21 months
C-17 Squadron Operations/Aircraft Maintenance Unit Facility	7	40,728	03	18 months
C-17 Engine Storage Facility	8	21,840	06	18 months
C-17 Addition and Alteration to Composite Shop	9	9,400	07	18 months
C-17 Wheel and Tire Shop	10	8,120	07	18 months
C-17 Munitions Maintenance Facility	11	6,000	06	21 months
Addition and Alteration to Life Support Shop	12	3,800	08	8 months
Electrical, Utilities, and Supporting Infrastructure	13	undetermined	03	18months
Taxiway Lima Repairs	14	610,000	07	12 months
C-17 Roads and Utilities	15	undetermined	05	18months
Road Adjustment	16	240,000	08	6 months
Total	NA	1,210,758	NA	NA

Note Location number corresponds to project location on Figure 2.4.2-4. Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable.

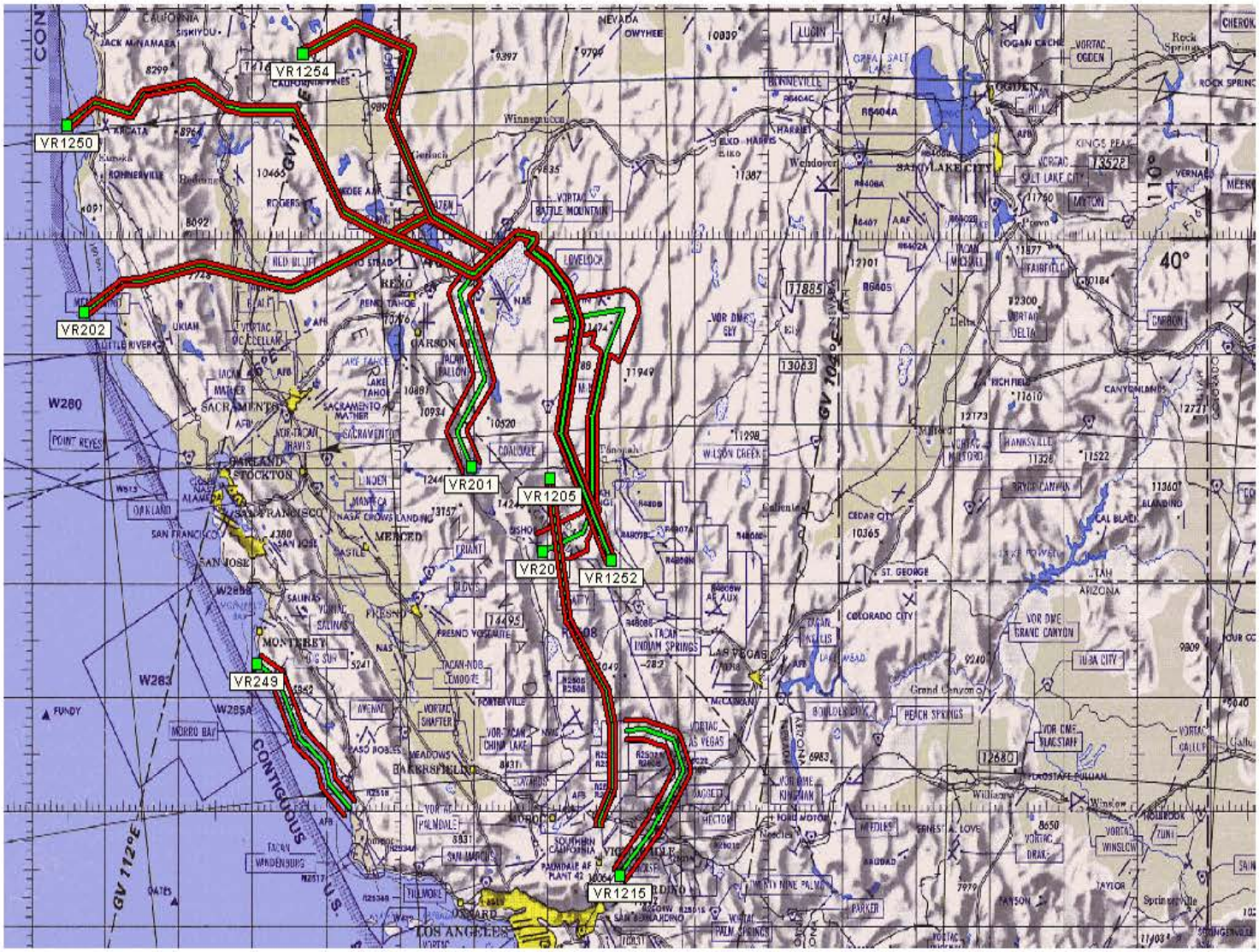
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Figure 2.4.2-1 Instrument Route Military Training Routes, Proposed Action, Travis AFB



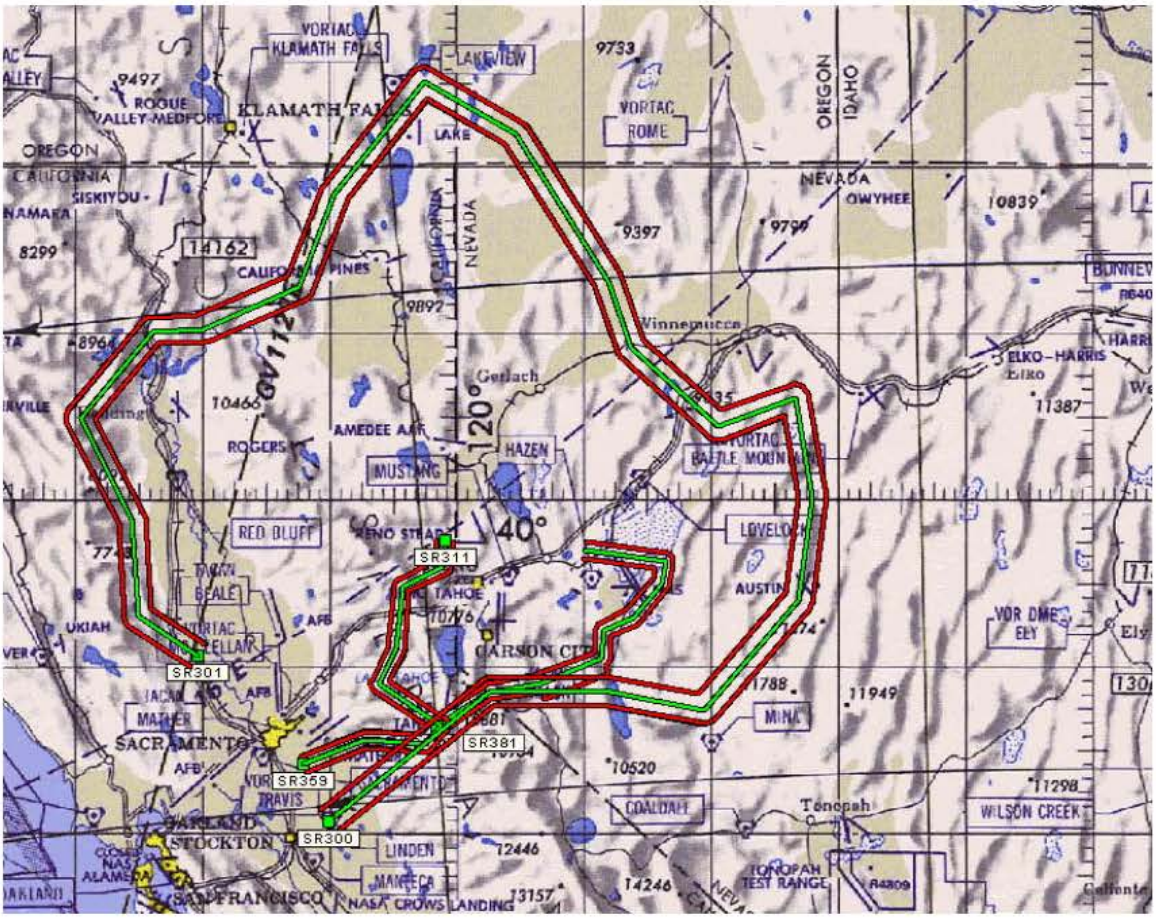
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Figure 2.4.2-2 Visual Route Military Training Routes, Proposed Action, Travis AFB



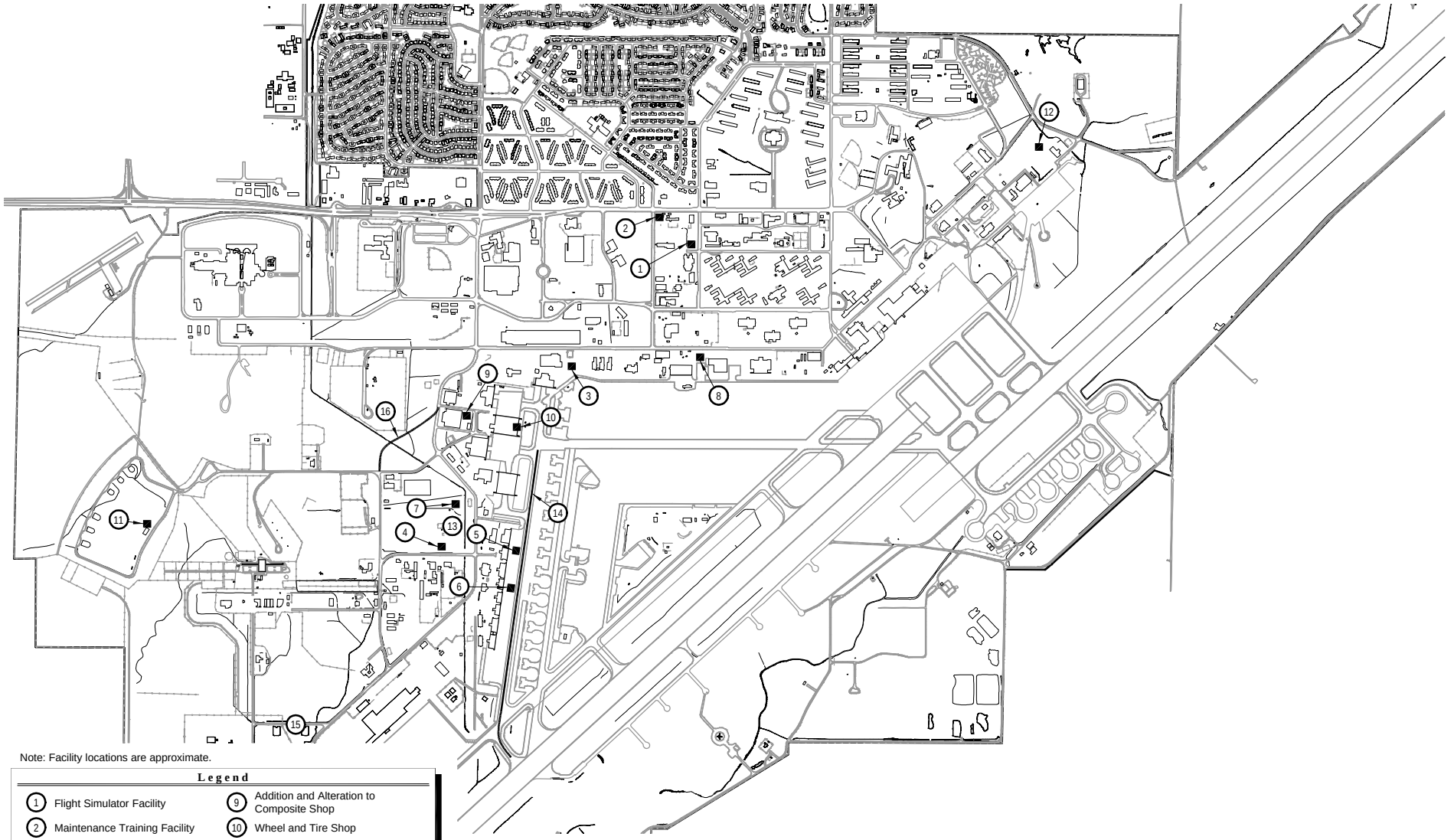
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Figure 2.4.2-3 Slow Route Military Training Routes, Proposed Action, Travis AFB



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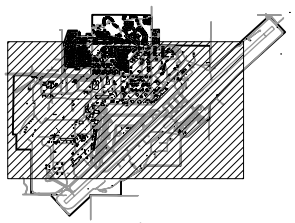


Note: Facility locations are approximate.

Legend

1 Flight Simulator Facility	9 Addition and Alteration to Composite Shop
2 Maintenance Training Facility	10 Wheel and Tire Shop
3 Aerospace Ground Equipment Facility	11 Munition Maintenance Facility
4 Aircraft Parts Store	12 Addition and Alteration to Life Support Shop
5 Two-Bay Hangar	13 Electrical, Utilities, and Supporting Infrastructure*
6 Nose Deck	14 Taxiway Lima Repairs
7 Squadron Operations/Aircraft Maintenance Unit Facility	15 C-17 Roads and Utilities*
8 Engine Storage Facility	16 Road Adjustment Total

* In Area Surrounding Specific Projects



Location Map

0 1,100 2,200

scale feet

Figure 2.4.2-4

Construction Projects Locations
Proposed Action

Travis AFB

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C-17 Flight Simulator Facility. The facility would house aircraft flight simulators and other special training devices used by the aircrews. The building, which would be located in the existing Travis AFB training campus, would also have space for administration and records, a learning center, briefing rooms, a break room, and storage.

C-17 Maintenance Training Facility. The facility would support a variety of technical, specialized C-17 maintenance training programs such as airframe, aircraft controls, and other aircraft systems. The facility would provide space for classrooms, shops, training resources, administration, and special high-bays.

C-17 Aerospace Ground Equipment Facility. The facility would support maintenance and repair of aircraft support equipment as well as vehicle refueling. The building would include space for work bays, a wash bay, administration, and storage. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system.

C-17 Aircraft Parts Store. The facility would provide space for four components: administration; storage for aircraft parts and components as well as flightline support; warehouse support areas (*e.g.*, mechanical); and special storage (*e.g.,* avionics equipment, sensitive materials, and batteries).

C-17 Two-Bay Hangar. The facility would accommodate two C-17 aircraft and would support heavy aircraft maintenance. The facility would have a high expansion foam fire extinguishing system in the maintenance bay area and a water sprinkler system in the administration area. The hangar would have a trench drain to accumulate spilled materials as well as high expansion foam and water fire suppression systems. A containment trench would be constructed to trap the high expansion foam should the chemical be released. The trapped high expansion foam would be pumped from the trench and disposed in accordance with applicable regulatory guidance. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system.

C-17 Nose Dock. The facility would house one C-17 aircraft and would be used for inspections and other aircraft maintenance activities not accomplished in the hangar or on the parking apron. The hangar would have a trench drain in the floor to accumulate spilled materials as well as high expansion foam and water fire suppression systems. The environmental controls would be as described for the hangar.

C-17 Squadron Operations/Aircraft Maintenance Unit Facility. The facility would provide space for command, administration, briefing rooms, flight planning, standardization/evaluation, readiness, and other flying squadron functions, as well as a ready room, readiness, and other aircraft maintenance personnel functions.

C-17 Engine Storage Facility. The facility would provide space for functions such as storage, inspection, and minor maintenance of C-17 engines.

C-17 Addition and Alteration to Composite Shop. The facility would provide space for repair of composite (nonmetallic) materials, plastic carbon reinforced epoxy, honeycomb, and composite/metal-bonded material. The facility would have a triple dry filter system to reduce particulate matter emissions and a filter system to reduce emissions of volatile organic compounds.

C-17 Wheel and Tire Shop. The facility would provide space for maintenance and repair of aircraft landing gear wheel and tire assemblies as well as equipment storage. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system. This facility would be constructed adjacent to Bldg. 810.

C-17 Munitions Maintenance Facility. Two separate buildings would be constructed. One facility would provide space for testing and maintenance of munitions packages used on the C-17 aircraft. The other facility would store munitions.

Addition and Alteration to Life Support Shop. This facility (Bldg. 1212) would provide space for three functional activities: life support function office; aircrew training; and life support equipment maintenance and storage. The facility would have an explosives/flare storage vault and a battery/hazardous material waste safety venting area.

Electrical, Utilities, and Supporting Infrastructure. Roads and infrastructure such as the water, wastewater, and electrical systems, would be improved to support the FY03 C-17 construction projects.

Taxiway Lima Repairs. Reconstruct Taxiway Lima to support C-17 aircraft.

C-17 Roads and Utilities. Roads and infrastructure such as the water, wastewater, and electrical systems, would be improved to support the FY04 C-17 construction projects. A new South Gate entrance would be constructed to inspect vehicles carrying materials for the C-17 facility construction projects. Another gate would be needed to avoid delays to the high volume of time-critical materials such as concrete should the delivery vehicle have to use other Base gates and encounter lengthy waits due to the security inspections of non-project vehicles entering the Base. The South Gate would be used to provide space for administration and a Base information transfer facility, as well as a canopy over the area in which commercial vehicles would be inspected, after the C-17 construction activity would be complete. Approximately 12.5 acres of land would be acquired to accommodate the South Gate project.

Road Adjustment. A portion of Ragsdale Street would be adjusted. Additionally, other Base roads affected by C-17 construction would be repaired or reconstructed. Ragsdale Street would be realigned through an open grassed area containing two vernal pools that may support endangered species. The two vernal pools comprise a total of 0.515 acre that could be directly affected. Additionally, there is another 0.485 acre within the area around the project site (*i.e.*, 250 feet on either side of the proposed alignment) to consider for indirect adverse effects. To mitigate or offset potential adverse effects to the vernal pools, the Air

Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS.

2.4.3 Alternative Action, McChord AFB

As an alternative to the Proposed Action, the Air Force would base and operate an additional 12 C-17 aircraft at McChord AFB, ultimately increasing the total number of C-17 aircraft at the Base to 60. A net increase of 631 Air Force active duty, reserve, and civilian personnel authorizations would occur as a result of the action, increasing the Base workforce to 10,481 persons. McChord C-17 aircrews would use nine MTRs currently scheduled and coordinated by the Base for low-level navigation training. Assault landing operations and other practice instrument approaches, takeoffs, and landings would be accomplished at the Grant County Airport, the airfield McChord AFB aircrews currently use for these operations. Sixteen facility construction, addition, and alteration projects would occur to support basing and operation activities. The basing action would begin in FY03 with facility construction projects and be complete in FY07 with the arrival of the 12th additional C-17 aircraft.

2.4.3.1 Airfield and Military Training Route Operations

A typical C-17 training sortie would include a departure, an air refueling, an MTR, assault landing training at Grant County Airport, and return to McChord AFB. Aircrews would practice takeoffs, landings, instrument approaches and departures, low and missed approaches, and touch and go landings and takeoffs at the Base before sortie termination. Approximately 3,456 training sorties would be flown annually from McChord AFB by the 60 assigned C-17 aircraft. The annual and average daily airfield operations for McChord AFB and Grant County Airport for the Alternative Action are listed in Tables 2.4.3-1 and 2.4.3-2, respectively. It is estimated that about 1,404 annual C-17 mission sorties would be flown where aircraft depart the Base for a worldwide airlift mission that supports the national military strategy. The number of projected C-17 sorties and airfield operations would be about 25 percent greater than that assessed in the McChord AFB C-17 Beddown EA.

Table 2.4.3-1 Annual and Average Daily Airfield Operations, Alternative Action, McChord AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	Annual	Avg. Daily	Annual	Avg. Daily	Annual	Avg. Daily
C-17	12,034	33.43	15,384	42.73	27,418	76.16
Transient	5,032	13.98	6,014	16.71	11,046	30.69
Total	17,066	47.41	21,398	59.44	38,464	106.85

Note: The C-17 airfield operations are the total operations associated with the mission and training sorties for 60 assigned aircraft. Approximately 19 percent of the C-17 operations would occur during nighttime (10:00 p.m. to 7:00 a.m.). Table 3.2.11-1 lists the operations for transient aircraft.

Table 2.4.3-2 Annual and Average Daily Airfield Operations, Alternative Action, Grant County Airport

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	Annual	Avg. Daily	Annual	Avg. Daily	Annual	Avg. Daily
C-17	534	1.45	2,006	5.50	2.540	6.95
C-17 ALZ	9,806	27.23	39,223	108.93	49,029	136.16
C-17 Subtotal	10,340	28.68	41,229	114.43	51,569	143.11
Other Aircraft	30,347	84.82	79,044	219.11	109,391	303.93
Total	40,687	113.50	120,273	333.54	160,960	447.04

Note: The C-17 airfield operations are the training operations associated with 60 assigned aircraft. Approximately 3 percent of the C-17 operations would occur during nighttime (10:00 p.m. to 7:00 a.m.). Table 3.2.11-2 lists the specific operations for the other aircraft.

McChord AFB aircrews would accomplish low-level navigation training on eight existing MTRs that are scheduled and coordinated by the Base. Table 2.4.3-3 lists the routes and the number of annual and monthly operations for each route. Figure 2.4.1-1 depicts the eight MTRs.

2.4.3.2 Construction and Building Addition/Alteration Projects

The Air Force would accomplish 16 construction and building addition alteration projects to support beddown of C-17 aircraft and ensuing operation at McChord AFB. Table 2.4.3-4 lists the size of the project in square feet as well as the estimated project start dates and durations. The location number in the table corresponds to the project location on Figure 2.4.3-1. The project description for the same type of facility at Travis AFB under the Proposed Action (see Section 2.4.2.2) would apply to the corresponding facility at McChord AFB. The following paragraphs briefly describe the construction actions unique to McChord AFB**.**

Table 2.4.3-3 Military Training Route Operations, Alternative Action, McChord AFB

	Operations	
Route	**Annual**	**Monthly**
IR-324/325	960	80
IR-326	320	27
IR-327/328	960	80
IR-329	320	27
IR-330	320	27
IR-340	640	53
VR-331	480	40
Total	4,000	334

Note: The C-17 MTR operations are the total operations for 60 assigned aircraft. IR-325 is the reverse of IR-324. IR-328 is the reverse of IR-327. Thus, operations for IRs 324 and 325 and IRs 327 and 328 are respectively combined. Monthly operations are rounded to the nearest whole number. Approximately 19 percent of the MTR operations would occur during nighttime (10:00 p.m. to 7:00 a.m.).

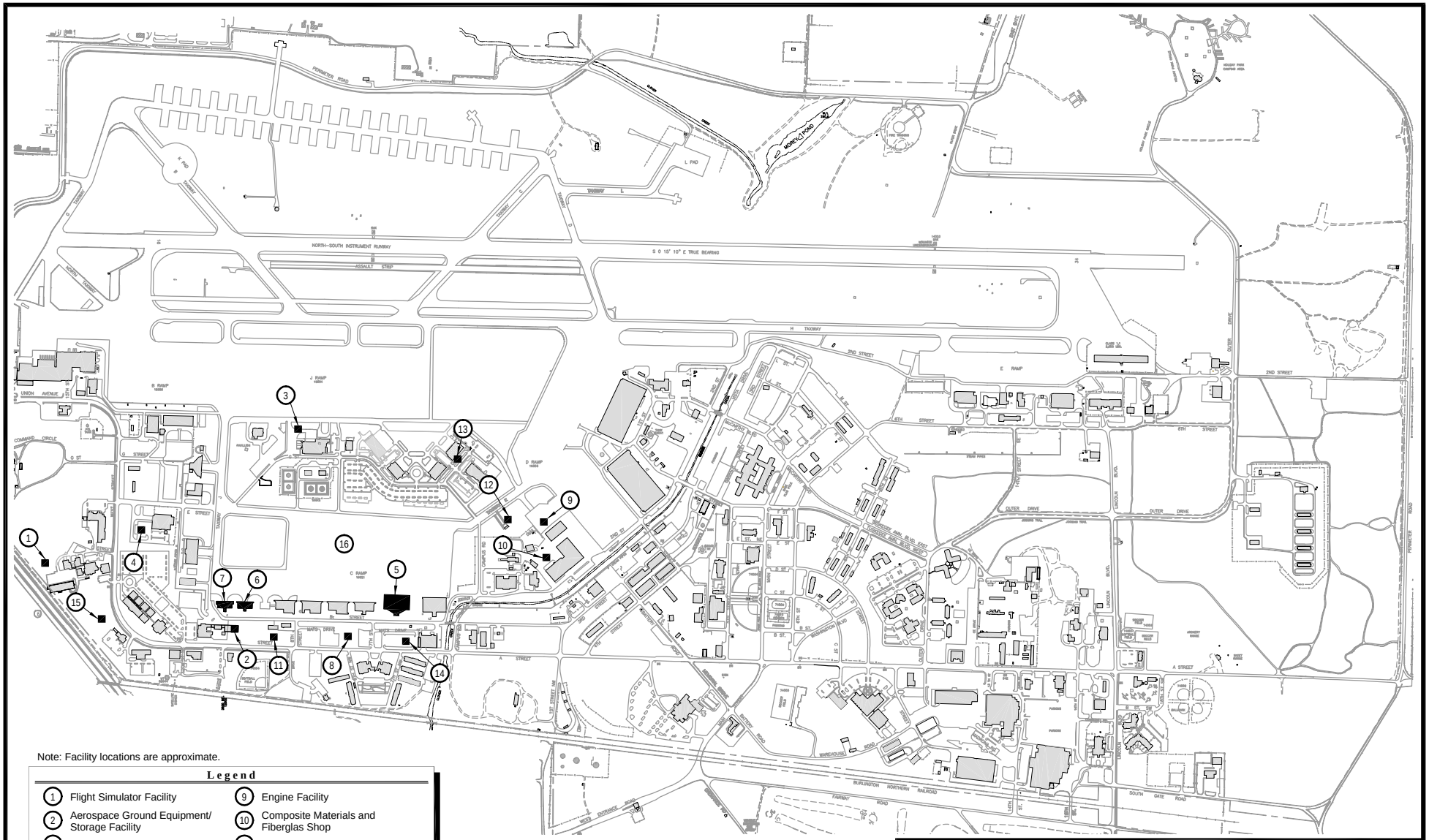
Table 2.4.3-4 Construction Project Information, Alternative Action, McChord AFB

Project	Location Number	Size (Square Feet)	Start Date	Duration
C-17 Flight Simulator Facility	1	12,750	03	12 months
C-17 Aerospace Ground Equipment/Storage Facility	2	29,950	06	12 months
C-17 Flightline Support Facility	3	10,000	03	12 months
Aerial Delivery Facility	4	10,000	04	12 months
C-17 Nose Dock	5	30,000	04	12 months
C-17 Nose Dock	6	30,000	05	12 months
C-17 Nose Dock	7	30,000	06	12 months
C-17 Squadron Operations/Aircraft Maintenance Unit Facility	8	35,020	03	12 months
C-17 Engine Facility	9	22,240	05	6 months
C-17 Composite Materials and Fiberglass Shop	10	16,942	06	6 months
C-17 Tire and Wheel Shop	11	14,000	07	6 months
C-17 Munitions Facility	12	1,000	06	6 months
Life Support Facility	13	6,525	05	6 months
Avionics Facility	14	8,300	05	6 months
Air Force Reserve Storage Facility	15	11,000	07	6 months
Ramp C Parking Apron Improvement	16	2,500,000	04	12 months
Total	**NA**	**2,767,727**	**NA**	**NA**

Note: Location number corresponds to project location on Figure 2.4.3-2. Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable.

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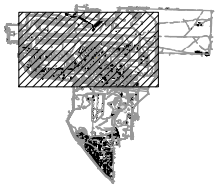
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Note: Facility locations are approximate.

Legend

1	Flight Simulator Facility	9	Engine Facility
2	Aerospace Ground Equipment/ Storage Facility	10	Composite Materials and Fiberglas Shop
3	Flightline Support Facility	11	Tire and Wheel Shop
4	Aerial Delivery Dock	12	Munitions Facility
5	Nose Dock	13	Life Support Facility
6	Nose Dock	14	Avionics Facility
7	Nose Dock	15	Air Force Reserve Storage Facility
8	Squadron Operations/Aircraft Maintenance Unit Facility	16	Ramp C Parking Apron Improvement



Location Map

0 500 1,000
scale feet

Figure 2.4.3-1

Construction Projects Locations
Alternative Action

McChord AFB

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Aerial Delivery Facility. A facility would be constructed to provide space for aerial delivery functions such as parachute packing, platform build-up, support shops, training, and storage.

Avionics Facility. A facility would be constructed to provide space for the administration and aircraft avionics repair functions.

Air Force Reserve Storage Facility. A covered storage facility would be constructed for the Air Force Reserve to replace the existing storage space that would be demolished to construct the nose docks.

Ramp C Parking Apron Improvement. A hydrant fueling system would be installed and the aircraft parking area would be repaved to support C-17 aircraft.

2.5 DESCRIPTION OF PAST AND REASONABLY FORESEEABLE FUTURE ACTIONS

Complete environmental impact analysis of the Proposed Action and alternatives must consider cumulative impacts due to other actions. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Travis AFB staff identified 18 other past and reasonably foreseeable actions that would occur concurrently with the Proposed Action, while McChord AFB staff listed six other actions that would occur during the Alternative Action.

2.5.1 Travis AFB

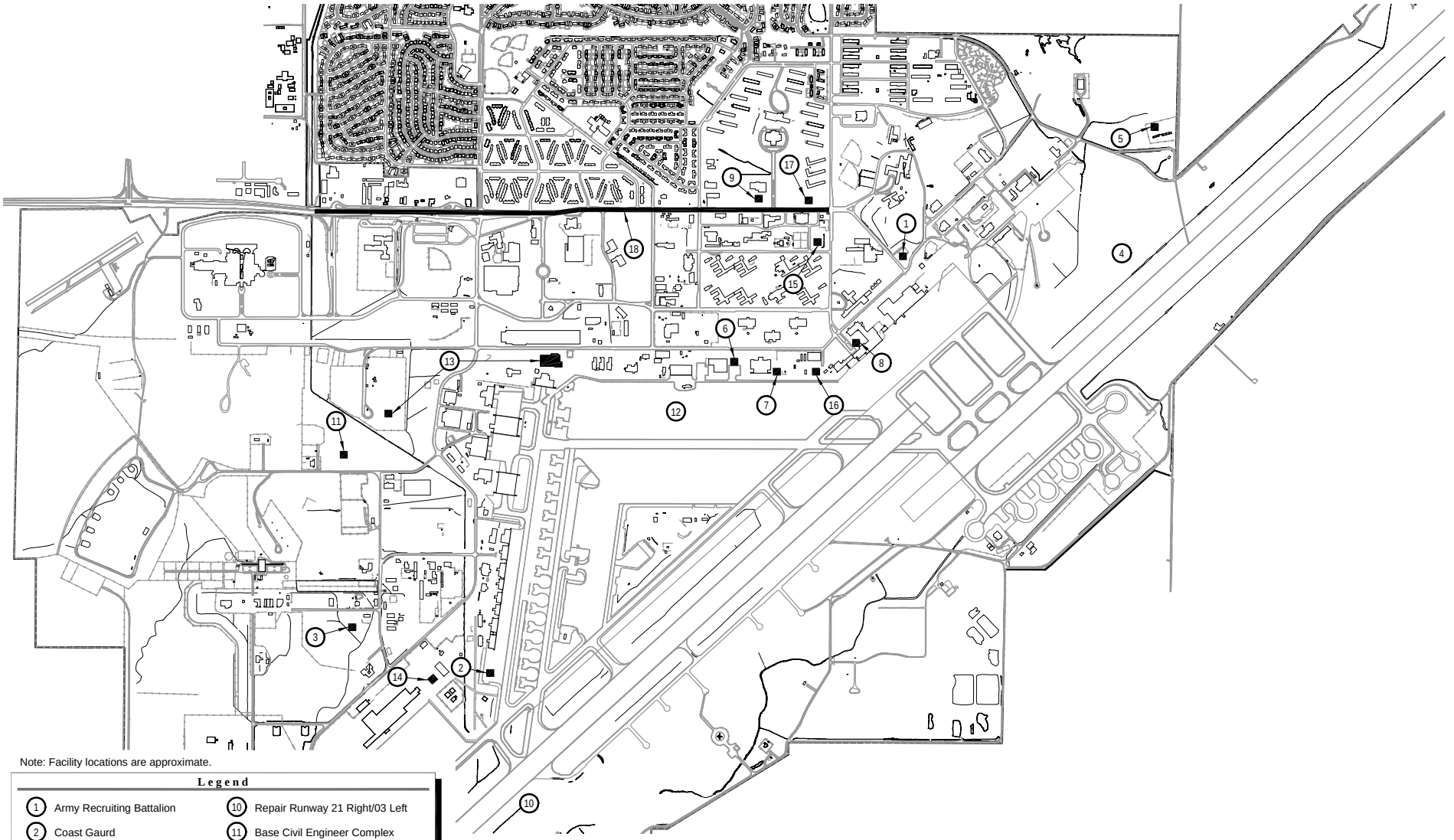
Table 2.5.1-1 lists the 18 other past and reasonably foreseeable actions for Travis AFB that could occur during the same time period as the Proposed Action. Figure 2.5.1-1 depicts the locations of the projects.

Table 2.5.1-1 Construction Project Information, Cumulative Condition, Travis AFB

Project	Location Number	Size (Square Feet)	Start Date	Duration
Construct Army Recruiting Battalion Facilities	1	12,152	04	12 months
Construct Coast Guard Facility	2	103,000	05	30 months
Global Reach Deployment Facility	3	92,190	04	12 months
Repair Runway 21Left/03 Right Electrical Elements	4	NA	04	6 months
Construct Combat Arms Campus	5	18,083	04	12 months
Construct Fire/Crash Rescue Station	6	30,192	05	12 months
Construct In-flight Kitchen/Fleet Service Facility	7	23,000	06	12 months
Construct Passenger Terminal	8	94,519	07	12 months
Construct Fitness Center Addition	9	43,000	08	12 months
Repair Runway 21Right/03 Left Electrical Elements	10	NA	08	6 months
Base Civil Engineer Complex	11	118,877	08	12 months
300 Parking Apron Improvement	12	2,500,000	04	10 months
Fuel Operations Facilities	13	60,000	03	18 months
Aerial Port Facility	14	2,400	02	9 months
Acoustical Support (Band) Facility	15	25,000	02	12 months
Radar Approach Control Center	16	31,500	03	10 months
Visitors Quarters	17	42,353	03	18 months
Repair Travis Avenue	18	1,100	03	4 months
Total	NA	3,197,366	NA	NA

Note: Location number corresponds to project location on Figure 2.5.1-1. Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable.

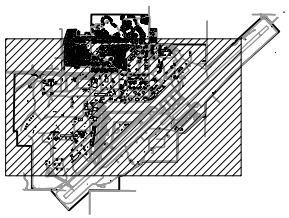
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Note: Facility locations are approximate.

Legend

1. Army Recruiting Battalion
2. Coast Gaurd
3. Global Reach Deployment Facility
4. Repair Runway 21 Left/03 Right
5. Combat Arms Campus
6. Fire/Crash Rescue Station
7. In-Flight Kitchen/Fleet Service Facility
8. Passenger Terminal
9. Fitness Center
10. Repair Runway 21 Right/03 Left
11. Base Civil Engineer Complex
12. 300 Parking Apron Improvement
13. Fuel Operations Facilities
14. Aerial Port Facility
15. Band Facility
16. RAPCON Facility
17. Visitors Quarters
18. Repair Travis Ave.



Location Map

0 1,100 2,200

scale feet

Figure 2.5.1-1

Construction Projects Locations
Cumulative Condition

Travis AFB

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Construct Army Recruiting Battalion Facility. This project would construct a new building to house the Army Recruiting Battalion that oversees Army recruiting activity through various recruiting offices in northern California. Approximately 46 military and civilian personnel would work in the facility.

Construct Coast Guard Facility. This project would construct command and administration buildings, flying operations, aircraft maintenance, and other support facilities needed to house as many as eight Coast Guard C-130 aircraft that would relocate to Travis AFB. The hangar would have environmental control features identical to those described for the C-17 hangars under the Proposed Action. Approximately 160 Coast Guard personnel would work at the facility. Table 2.5.1-2 lists the annual and average daily Coast Guard airfield operations for the cumulative condition.

Table 2.5.1-2 Annual and Average Daily Airfield Operations, Cumulative Condition, Travis AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	Annual	Avg. Daily	Annual	Avg. Daily	Annual	Avg. Daily
C-17	2,184	6.17	4,807	13.73	6,991	19.90
C-5	1,642	4.50	15,159	51.39	16,801	55.89
KC-10	5,439	14.90	26,450	89.66	31,889	104.56
Navy E-6	1,236	3.38	3,066	8.40	4,302	11.78
Aero Club	5,008	13.72	2,102	5.76	7,110	19.48
Coast Guard C-130	1,356	3.72	2,172	7.43	4,068	11.15
Transient	5,644	15.45	1,124	3.08	6,768	18.53
Total	22,509	61.84	55,420	179.45	77,929	241.29

Note: Approximately 14 percent of the operations occur during the evening (7:00 p.m. to 10:00 p.m.), while 11 percent occur during nighttime (10:00 p.m. to 7:00 a.m.). Aero club operations occur on a runway about two miles west of the Travis AFB primary runways and which is dedicated to aero club aircraft. Table 3.1.11-1 lists the operations for transient aircraft.

Construct Global Reach Deployment Facility. This project would provide space for administration, a high bay warehouse with mezzanines, low bay maintenance shop, washrack/vehicle maintenance facility, and adjacent covered storage. The mission of the 615th Air Mobility Operations Group is to maintain a ready core of AMC mobility support forces required to execute the full spectrum of Global Reach Laydown operations as directed by the Tanker Airlift Control Center.

Repair Runway 21Left/03Right Electrical Elements. This project would construct runway, airfield lighting, fiber-optic communication lines, markers, and a lighting vault.

Construct Combat Arms Campus. This project would construct a facility to be used in conjunction with a small arms firing range system. Functional space includes a classroom area, administrative offices, supply/tool storage, weapons maintenance area, weapons/ammunition storage, target/miscellaneous storage, and mobility/contingency warehouse. This project includes demolition of a 10,549 square foot structure.

Construct Fire/Crash Rescue Station. This project would provide vehicle stalls, offices, communication center, sleeping quarters, training rooms, kitchen, dining room,

storage, women's and men's latrines, showers, and locker rooms, mechanical equipment room, and all necessary support. Building 560 (16,436 square feet) would be demolished.

Construct In-Flight Kitchen/Fleet Service Facility. The facility would provide space for refrigerated and dry storage areas, food preparation/support space, including kitchen, utensil wash area, garbage and trash areas, administrative space, lockers/break area for fast food service, small snack bar, and in-flight kitchen. This project includes demolition of a 1,658 square foot concrete structure and a 67,350 square foot wood structure.

Construct Passenger Terminal. This project would provide space for administration, seating, and other functions associated with handling passengers for those aircraft sorties that transport passengers to or from Travis AFB.

Construct Fitness Center Addition. This project would construct an addition to the existing physical fitness center to provide space for weight lifting, ergonometric training, men's and women's locker rooms/showers/latrines, outdoor 25-meter lap pool, bathhouse and multi-purpose exercise training areas. This project would include all necessary and required work, including seismic work. This project includes demolition of a 32,593 square foot facility.

Repair Runway 21Right/03Left Electrical Elements. This project would replace deficient airfield lighting and markers and repair the existing runway.

Base Civil Engineering Complex. The multi-building complex would provide space for command, administration, operations center, resource flight, shop, warehouse, covered/sheltered storage, entomology, disaster preparedness training; prime Base engineer emergency force; air base operability; and readiness warehouse/mobility processing functions in a centralized civil engineering complex.

300 Parking Apron Improvement. Six C-17 parking spots would be reconstructed in the 300 area of the Travis AFB aircraft parking apron. Additionally, the project would repair deteriorated pavements as well as the hydrant fueling system for the 300 area.

Fuel Operations Facility. Two existing above ground storage tanks would be demolished in the fuel storage area. Three above ground tanks (two for jet fuel and one for diesel), all with proper containment provisions, would be constructed in the same area. Additionally, a 60,000 square foot maintenance facility would be demolished to make room for a facility approximately the same size that would provide space for the administration activities associated with fuels management, as well as maintenance and parking.

Aerial Port Facility. The 2,400 square foot facility would house approximately 40-80 personnel currently assigned to Travis AFB and whose duties include loading and off loading of aircraft. The facility would provide space for offices, training, lockers, rest rooms, and a kitchen.

Acoustical Support (Band) Facility. The 25,000 square foot facility would include the following features: acoustically treated rehearsal studios; conference/training rooms; music library; administrative space; restrooms; break rooms; and storage. A parking lot also would be constructed.

Radar Approach Control Center. The 31,500 square foot facility would provide space for the following activities: operations; briefing room; training; administrative space; equipment storage; equipment maintenance; restrooms; and secure storage.

Visitor's Center. The 42,353 square foot facility would provide rooms for aircrew personnel that transit Travis AFB, reservists on active duty at the Base, and personnel relocating to/from the Base. The building would have 242 single occupancy rooms; 100 double guest rooms; eight handicap accessible single rooms; administrative space; supply space; and public restrooms.

Repair Travis Avenue. The project would repair an approximate 2-mile segment of pavement on Travis Avenue from the Base boundary to Burgan Avenue. The project would include widening a 275-foot portion of the avenue by about 4 feet. A median also would be added to the avenue.

2.5.2 McChord AFB

The Air Force and local community have six other past and reasonably foreseeable actions for McChord AFB that could occur during the same time period as the Alternative Action, Travis AFB. Table 2.5.2-1 lists the projects, and Figure 2.5.2-1 depicts the locations of the projects.

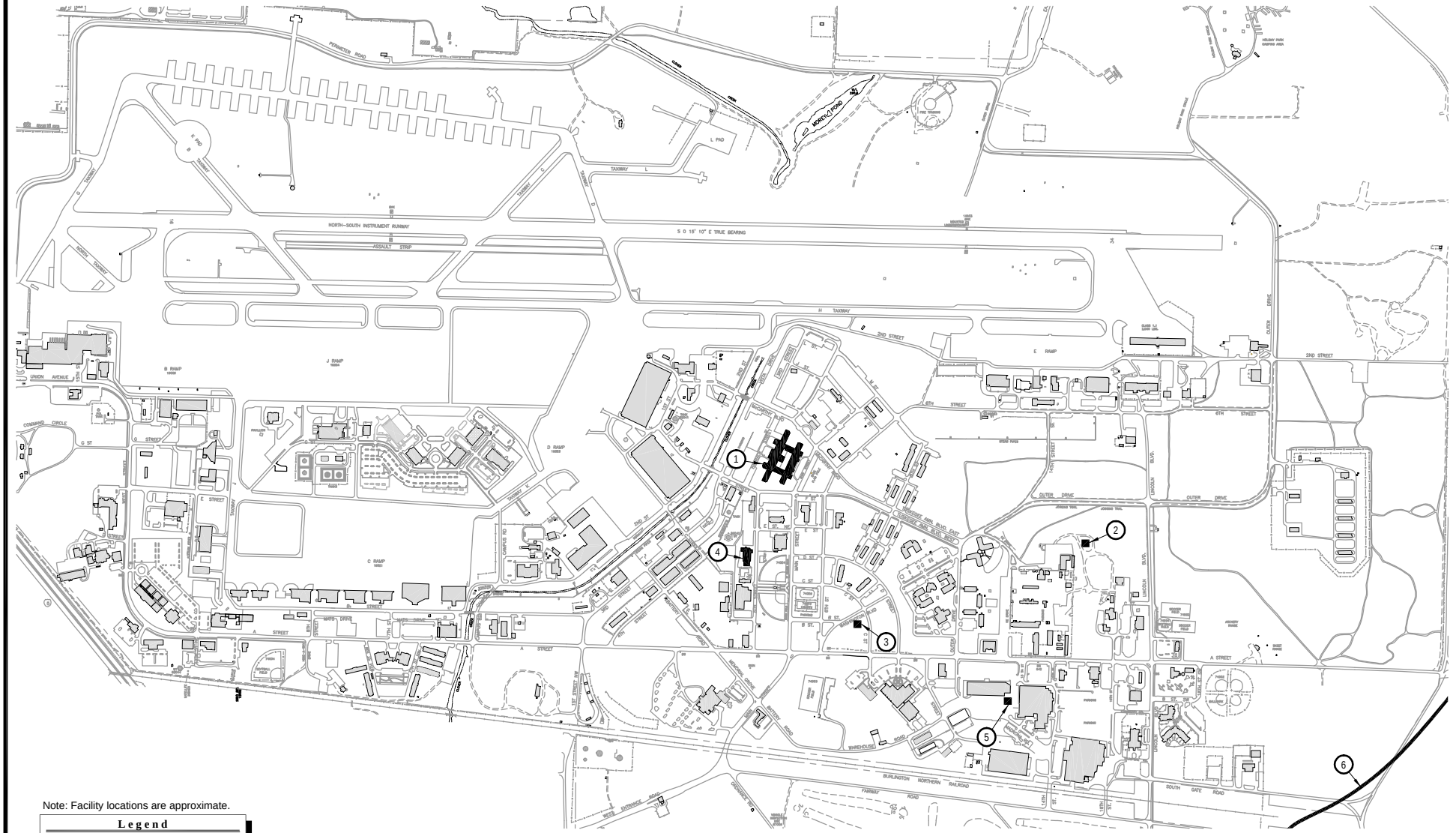
Table 2.5.2-1 Construction Project Information, Cumulative Condition, McChord AFB

Project	Location Number	Size (Square Feet)	Start Date	Duration
Renovate Building 100	1	See note	04	6 months
Construct Base Civil Engineer Complex	2	327,776	05	12 months
Construct Chapel Center	3	32,205	06	12 months
Construct Physical Fitness Training Facility	4	77,715	07	12 months
Relocate Base Exchange	5	131,398	03	12 months
Construct Cross Base Highway	6	2,925,000	08	24 months
Total	NA	3,464,094	NA	NA

Note: Location number corresponds to project location on Figure 2.5.2-1. Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable. Size for Building 100 Renovation not listed because all activity would be to the interior.

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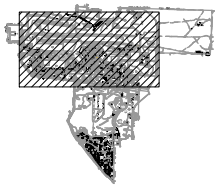
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Note: Facility locations are approximate.

Legend

1. Renovate Building 100
2. Base Civil Engineer Complex
3. Chapel Center
4. Physical Fitness Training Facility
5. Base Exchange
6. Cross Base Highway



Location Map

0 500 1,000

scale feet

Figure 2.5.2-1

Construction Projects Locations
Cumulative Condition

McChord AFB

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Renovate Building 100. This project would renovate the Mission Support Center. When completed, the building, originally constructed as a barracks, would consolidate the 62 AW and Group headquarters and community support functions into one building.

Construct Base Civil Engineering Complex. The multi-building complex would provide space for pavements and grounds and maintenance functions, as well as both covered and open storage, in a centralized civil engineering complex. Ten substandard wood frame buildings totaling 72,904 square feet would be demolished as part of the project.

Construct Chapel Center. This project would construct a center to house all religious, social, and humanitarian services for Base personnel. Two substandard wood frame buildings totaling 7,104 square feet being used as chapels would be demolished as part of the project.

Construct Physical Fitness Training Facility. This project would construct a new physical fitness center on the existing gymnasium and swimming pool site. A cover would be constructed over the existing pool. The existing 15,241 square foot gym would be demolished as part of the project.

Relocate Base Exchange. This project would construct a new Base Exchange and then demolish the existing approximate 95,000 square foot exchange.

Construct Cross Base Highway. This project would construct an approximate 4.5 miles east-west arterial between the intersection of State Route 7 and 176th Street on the east side of the Base and Interstate 5 on the west side.

2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action which includes: basing 12 C-17 aircraft at Travis AFB; relocating 16 C-5 aircraft to another installation; using 19 MTRs for low-level navigation training; decreasing the number of personnel authorizations by 161 positions; and constructing 16 facilities projects at the Base.

2.7 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2.7 summarizes the impacts of the Proposed Action, Alternative Action, and No Action Alternatives.

As part of the Proposed Action to realign Ragsdale Street, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset potential adverse effects to vernal pools from the road realignment.

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Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Air Quality)	**Travis AFB**. The greatest increase for any of the criteria air pollutants would be 1,483.211 tons per year (tpy) for nitrogen oxides (NO_x), which equates to 0.6271 percent of the baseline emissions within the air quality control region (AQCR). The CAA General Conformity Applicability Analysis prepared in June 2003 concluded that the net change in emissions for criteria pollutants would not be regionally significant, would not exceed *de minimis* thresholds, and that a Conformity Determination would not be required. **MTRs**. Emissions from C-17 operations on the MTRs within the affected AQCRs and air basins would not be regionally significant.	**McChord AFB**. The greatest increase in emissions would be NO_x (861.855 tpy) from recurring aircraft operations, which equates to 10.7732 percent of the NO_x emissions within the AQCR. Although the NO_x emissions in the AQCR exceed 10 percent of the baseline for the pollutant, the exceedance is slight. Additionally, the AQCR is in attainment for NO_x. The emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. The air emission impacts from the activities associated with the Alternative Action would not be considered significant and a Conformity Determination would not be required. **Grant County Airport**. The greatest increase in emissions would be NO_x (1,884.0 tpy) from recurring aircraft operations, which equates to 102.9508 percent of the NO_x emissions within the AQCR. The AQCR is in attainment for NO_x; thus; the emissions would not be regionally significant. The emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. **MTRs**. Emissions from C-17 operations on the MTRs within the affected AQCRs would not be regionally significant.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Noise	**Travis AFB**. The number of people exposed to Community Noise Equivalent Level (CNEL) 60 decibels (dBA) and greater would decrease by 15 percent. It is anticipated there would be a corresponding decrease in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption should decrease due to the lower aircraft-produced noise at the schools and the fewer overflights due to the reduction in airfield operations. Construction noise would be temporary, would occur only during daytime, and would cease when the project is completed. **MTRs**. The L_{dnmr} would range from a low of 36 dBA to a high of 62 dBA on the 19 MTRs, with the maximum increase being 4 dBA on one route. Noise from MTR operations would not exceed the level at which residential and other noise-sensitive land uses would be unacceptable. The hearing loss, speech interference, sleep disruption, and non-auditory health effects discussions for Travis AFB apply. No structural damage would be expected from C-17 operations on an MTR.	**McChord AFB**. An additional 510 people (14 percent) would be exposed to Day-Night Average Sound Level (DNL) 65 dBA and greater. The density in the newly exposed area would be 2.77 persons per acre, a density that is consistent with adjacent residential areas exposed to aircraft noise under the current condition. It is anticipated there would be a corresponding increase in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption would increase due to the increased aircraft-produced noise at the schools and the greater overflights due to the increase in airfield operations. Construction noise would be temporary, would occur only during daytime, and would cease when the project is completed. **Grant County Airport**. The number of people exposed to DNL 65 dBA and greater would increase by 14 percent (3 persons). It is anticipated there would be a corresponding increase in the potential for sleep awakenings and speech disruption when compared to the baseline condition. Noise-induced hearing loss would not be anticipated. The potential for classroom disruption should increase due to the increased aircraft-produced noise at the schools and the greater overflights due to the increase in airfield operations. **MTRs**. The L_{dnmr} would range from a low of 50 dBA to a high of 60 dBA on the nine MTRs, increasing 1 dBA on each route. Noise from MTR operations would not exceed the level at which residential and other noise-sensitive land uses would be unacceptable. The hearing loss, speech interference, sleep disruption, and non-auditory health effects discussions for McChord AFB apply. No structural damage would be expected from C-17 operations on an MTR.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Hazardous Wastes, Hazardous Materials, and Stored Fuels	The contractor would comply with all regulatory guidance for the use and disposal of hazardous materials and wastes during construction activities. The primary waste producing processes would continue to include aircraft parts cleaning, fluid changes for routine aircraft and vehicle maintenance, aircraft corrosion control, facility, and infrastructure maintenance. It is not anticipated any new hazardous materials would be needed. Hazardous material procurement and hazardous waste generation could decrease by about six percent, respectively. The existing hazardous materials handling and hazardous waste disposal processes and procedures would accommodate the activities associated with C-17 operation and maintenance. It is anticipated that the amount of fuel needed for operations would decrease by six percent.	The Proposed Action Summary applies, except that hazardous material procurement and hazardous waste generation could increase by 25 percent due to the increase from 48 to 60 assigned aircraft. Although the additional 12 aircraft would increase the need for fuel, the Base fuels storage and dispensing system has the capacity to accommodate the additional fuel requirement.	No significant impacts occur from the baseline activities.
Water Resources	The construction contractor would prepare and use a storm water pollution prevention plan with erosion control and spill control measures to minimize the potential for surface and groundwater quality degradation. The amount of impervious cover would increase by about 1.4 percent, which could result in a corresponding increase in storm water runoff. The box culverts associated with the Ragsdale Street relocation would be constructed in accordance with design standards for floodplains and associated Section 404 permit requirements.	The construction contractor would prepare and use a storm water pollution prevention plan with erosion control and spill control measures to minimize the potential for surface and groundwater quality degradation. The amount of impervious cover would increase by about 0.4 percent, which could result in a corresponding increase in storm water runoff. No facilities construction would occur in a floodplain.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Biological Resources	**Travis AFB**. Design and placement of culverts for any crossings of Union Creek will follow guidelines provided by the National Marine Fisheries Service to avoid affecting downstream riparian/aquatic habitat quality. Work within the wetlands and in the Union Creek channel would require Section 404/401 permits from the U.S. Army Corps of Engineers. Realigning Ragsdale Street will result in direct impact to two vernal pools and indirect impact to an additional vernal pool. Since previous studies did not confirm the presence or absence of listed species in these vernal pools, the Air Force will purchase approximately 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment. **MTRs**. MTR overflights would be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.	**McChord AFB**. Construction activities would occur within developed, maintained areas with extant, highly modified and disturbed landscape, and would not substantially change habitat for plant or animal species. No endangered, threatened, or special status species are documented in the construction areas. No activities would occur within a wetland. **MTRs**. MTR overflights would be infrequent, random, and pose no threat to wildlife at the behavioral, population, or species level.	No significant impacts occur from the baseline activities.
Socioeconomic Resources	There would be a decrease in the local and regional population of 364 (0.07 percent of the statistical area) as a result of the loss of 161 positions. It is anticipated that approximately 175 housing units (0.1 percent of the statistical area) would become vacant with the loss of personnel, with approximately one-half of these units being on-Base and one-half being off-Base. There would be an enrollment decrease of approximately 112 children in local schools (2.2 percent in the district nearest the base). Employment generated by construction activities would result in wages paid, and expenditures for local and regional services and supplies during construction. The reduction of 161 personnel authorizations would result in a loss in wages paid, business sales, and income to the local and regional economy.	There would be an increase in the local and regional population of 1,500 (0.214 percent of the statistical area) as a result of a net gain of 631 positions. The current housing and apartment supply is more than adequate to accommodate the demand for approximately 600 housing units. Enrollment of the anticipated 430 additional students in the district nearest the Base would increase enrollment by three percent. However, some of the other school districts within the county would absorb some of this enrollment increase. Employment generated by construction activities would result in wages paid, and increase expenditures for local and regional services and supplies during construction. The addition of 631 personnel authorizations would result in an increase in wages paid, business sales, and income to the local and regional economy.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Cultural Resources	The Proposed Action would not result in impacts to archaeological resources on Travis AFB. The Proposed Action would result in construction of a facility adjacent to Bldgs. 810 and renovations to Bldg. 1212, both NRHP-eligible properties on Travis AFB. Design, construction and renovation would be conducted in accordance with the Travis AFB CRMP and in consultation with the California SHPO. Impacts to historic resources would be avoided. **MTRs**. Impacts to cultural resources would not occur because the maximum noise from a C-17 is below the level at which vibration impacts would be anticipated. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2 and replied to four responses from Native American groups concerning the proximity of their reservation to MTRs. As a result of the response from the Karuk Tribe of California and subsequent consultation, the Air Force coordinated with the Navy as the MTR originating/scheduling activity to establish overflight avoidance areas of 3 miles and not lower than 1,500 feet AGL for two sites along VR-1250 where sacred ceremonies are conducted in the summer months. The other three responses were resolved by the Air Force's answer.	The Alternative Action would not result in impacts to archaeological or historic resources on Travis AFB. Cultural resources impacts within the MTR corridors is the same as that described for the Proposed Action. The Air Force consulted with Native American tribes pursuant to 36 CFR 800.2.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Land Use	**Travis AFB**. Facility construction would be consistent with existing and future land use plans and programs identified in the Travis AFB General Plan. The landfill located in the southwest accident potential zone I would continue to be incompatible with Air Force Air Installation Compatible Use Zone (AICUZ) recommendations. No additional land use incompatibilities would be anticipated. **MTRs**. No significant impacts to sensitive land uses would occur because of the slight increase (L_{dnmr} 4 dBA on one route) in noise levels or the additional overflights.	**McChord AFB**. Facility construction would be consistent with existing and future land use plans and programs identified in the McChord AFB General Plan. Additional exposure to DNL 65-70 dBA would occur in off-Base areas that are not currently exposed to this level of noise. Although residences are not recommended in these noise zones unless attenuation materials are installed, the number of additionally exposed residences in the DNL 65-70 dBA noise zone would be extremely small when compared to the baseline. Additionally, the condition (*i.e.*, additional residences in the DNL 65-70 dBA noise zone) would be consistent with existing land use in the area because other residences occur in these noise zones under the baseline condition. Therefore, the additional noise exposure from the Alternative Action would not be inconsistent with local land use plans. Although additional residences would be exposed to DNL 65 dBA and greater and this increase would be incompatible according to AICUZ guidance, the increases would not require the Air Force to update its current AICUZ Study according to AICUZ program guidance. **Grant County Airport**. Land use plans for the local community would not be affected. **MTRs**. No significant impacts to sensitive land uses would occur because of the slight increase (L_{dnmr} 1 dBA) in noise levels or the additional overflights.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Infrastructure and Utilities	There would be a 1.1 percent reduction in water consumption when compared to the baseline condition due to the 161 fewer personnel. Use of water for dust control equates to about 1.6 percent of system capacity. Wastewater generation would be reduced by 1.2 percent reduction when compared to the baseline condition. The 1.4 percent increase in impervious cover likely would increase flow in the storm water system. The electricity and natural gas distribution systems capacities are more than adequate to handle the 0.01 percent increase in demand for the new buildings. The disposal of construction and demolition debris equates to less than 0.004 percent of the total remaining landfill capacity. Solid waste generation by personnel would decrease slightly due to the reduction in assigned personnel. The net loss of 161 personnel (1 percent of baseline assigned personnel) would result in a very slight decrease in weekday on-Base roadway volumes.	There would be a 1.5 percent increase in water consumption when compared to the baseline condition due to the addition of 631 personnel. Use of water for dust control equates to about 4.5 percent of system capacity. Wastewater generation would increase by 0.7 percent when compared to the baseline condition. The 0.4 percent increase in impervious cover likely would increase flow in the storm water system. The electricity and natural gas distribution systems capacities are more than adequate to handle the 0.01 percent increase in demand for the new buildings. The disposal of construction and demolition debris equates to less than 0.1 percent of the total remaining landfill capacity. Solid waste generation by personnel would increase slightly due to the increase in assigned personnel. The net increase of 631 personnel (6 percent of baseline assigned personnel) would result in an increase in weekday on-Base roadway volumes.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Airspace and Airfield Operations	**Travis AFB**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, would accommodate C-17 operations, as well as the overall decrease of 12.67 average daily airfield operations. **MTRs**. Each MTR has the capacity to accommodate the additional operations and the structure for each route can support C-17 operations. The potential for conflict between aircraft operating on the MTRs as well as other civil aircraft operating in the airspace around the MTRs is low because the existing scheduling and air traffic control procedures are designed to deconflict aircraft. The probability is low that an aircraft involved in an accident at or around the Travis AFB airfield or on a MTR would strike a person or structure on the ground. The potential for bird-aircraft strikes associated with airfield operations at Travis AFB would be expected to decrease commensurate with the decrease in flying hours at the Base. It is anticipated that about 5 bird-aircraft strikes would occur annually from Travis AFB C-17 MTR operations.	**McChord AFB**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional 15.23 average daily C-17 operations. **Grant County Airport**. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional 28.63 average daily C-17 operations. **MTRs**. The airspace management and procedures discussion and analysis for the Proposed Action apply to the alternative. Each MTR has the capacity to accommodate the additional operations and the structure for each route can support C-17 operations. The probability is low that an aircraft involved in an accident at or around the McChord AFB and Grant County Airport airfields or on a MTR would strike a person or structure on the ground. It is estimated that about 31 bird-aircraft strikes would occur for a one-year period in the area around the airfield. It is anticipated that about 5 bird-aircraft strikes would occur annually from McChord AFB C-17 MTR operations.	No significant impacts occur from the baseline activities.

Table 2.7 Summary of Environmental Impacts for the Proposed Action, Alternative Action, and No Action Alternative *(…continued)*

Resource (Applicable Sections)	Proposed Action	Alternative Action	No Action Alternative
Environmental Management	The activities associated with the action would be accomplished using existing directives and would not impact achieving pollution prevention goals. The demolition contractor would be responsible for asbestos containing material (ACM) and lead-based paint (LBP) removal, which would be accomplished in accordance with existing guidance. The proposed facilities would be constructed or renovated without any ACM and LBP. Facilities design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would avoid interference with any ongoing Environmental Restoration Program (ERP) investigation and remediation work and would not worsen the condition of any site. New facilities construction would not result in any substantial changes to physiographic features. No significant soils impacts would be anticipated. Construction activity would occur within an area in which the soils have been disturbed and modified by prior activities.	The summary for the Proposed Action applies to the alternative.	No significant impacts occur from the baseline activities.

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CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the existing environmental resources that could be affected by or could affect the Proposed and Alternative Actions and No Action Alternative. Only those specific resources relevant to the potential impacts are described in detail.

3.1 TRAVIS AFB

3.1.1 Introduction

The mission of the AMC is to provide airlift, air refueling, special air missions, aeromedical evacuation, operational support airlift, weather reconnaissance, and combat camera/courier service in support of national objectives. As the Air Force global reach provider, AMC serves as the lead command for requirements, operating procedures, aircrew training, tactics, standardization and evaluation, and overall fleet management for tanker and airlift aircraft. Serving as the Air Force component of the U.S. Transportation Command, AMC is the single manager for air mobility and, when directed, provides forces to theater commands to support wartime taskings. The command also provides tanker forces to meet single integrated operational plans.

Travis AFB is home to Headquarters 15th Air Force (15 AW), the 60th Air Mobility Wing (AMW), the 349th AMW, an AFRC Reserve Associate unit, and dozens of other tenant units, including a detachment of the Navy's Fleet Air Reconnaissance Squadron THREE and the Army's 3rd Brigade, 91st Division. The primary mission of the Base is to be "America's First Choice" for providing rapid global mobility: the airlift and air refueling assets needed to deliver military aircraft, people and equipment wherever and whenever they are needed. To support the National Military Strategy, the 60 and 349 AMWs fly worldwide airlift missions as well as train all C-5 and KC-10 aircrew positions to ensure crews are current in airlift and air refueling procedures.

3.1.2 Air Quality

3.1.2.1 Air Pollutants and Regulations

Air quality in any given region is measured by the concentration of various pollutants in the atmosphere, typically expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Air quality is not only determined by the types and quantities of atmospheric pollutants, but also by surface topography, size of the air basin, and by prevailing meteorological conditions.

The Clean Air Act, as amended in 1977 and 1990, provides the basis for regulating air pollution to the atmosphere. Different provisions of the CAA apply depending on where the source is located, which pollutants are being emitted, and in what amounts. The CAA required the USEPA to establish ambient ceilings for certain criteria pollutants. These criteria pollutants are usually referred to as the pollutants for which the USEPA has established

National Ambient Air Quality Standards (NAAQS). The ceilings were based on the latest scientific information regarding effects a pollutant may have on public health or welfare. Subsequently, the USEPA promulgated regulations that set NAAQS. Two classes of standards were established: primary and secondary. Primary standards define levels of air quality necessary, with an adequate margin of safety, to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards define levels of air quality necessary to protect public welfare (*e.g.*, decreased visibility, damage to animals, crops, vegetation, wildlife, and buildings) from any known or anticipated adverse effects of a pollutant.

Air quality standards are currently in place for six pollutants or "criteria" pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (SO_x, measured as sulfur dioxide [SO_2]), lead (Pb), and particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}). There are many suspended particles in the atmosphere with aerodynamic diameters larger than 10 micrometers. The collective of all particle sizes is commonly referred to as total suspended particulates (TSP). TSP is defined as particulate matter as measured by methods outlined in 40 CFR Part 50, Appendix B. The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for establishment of emission limitations by the states for the pollutants USEPA determines may endanger public health or welfare.

Ozone (ground-level ozone), which is a major component of "smog," is a secondary pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly nitrogen oxides (NO_x) and volatile organic compounds (VOC). NO_x is the designation given to the group of all oxygenated nitrogen species, including nitric oxide (NO), NO_2, nitrous oxide (N_2O), and others. However, only NO, NO_2, and N_2O are found in appreciable quantities in the atmosphere. VOCs are organic compounds (containing at least carbon and hydrogen) that participate in photochemical reactions and include carbonaceous compounds except metallic carbonates, metallic carbides, ammonium carbonate, CO_2, and carbonic acid. Some VOCs are considered non-reactive under atmospheric conditions and include methane, ethane, and several other organic compounds.

As noted above, O_3 is a secondary pollutant and is not directly emitted from common emissions sources. Therefore, to control O_3 in the atmosphere, the effort is made to control NO_x and VOC emissions. For this reason, NO_x and VOCs emissions are calculated and reported in emission inventories.

The CAA does not make the NAAQS directly enforceable. However, it does require each state to promulgate a State Implementation Plan (SIP) that provides for "implementation, maintenance, and enforcement" of the NAAQS in each Air Quality Control Region (AQCR) in the state. The CAA also allows states to adopt air quality standards more stringent than the federal standards. The ambient air quality standards for California are contained in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations (CCR). Table 3.1.2-1 lists the national and California ambient air quality standards.

Table 3.1.2-1 National and California Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Primary NAAQS[a,b,c]	Secondary NAAQS[d]	California Standards[e,f]
Carbon Monoxide	8-hour 1-hour	9 ppm (10,000 μg/m3) 35 ppm (40,000 μg/m3)	No standard No standard	9 ppm (10,000 μg/m3) 20 ppm (20,000 μg/m3)
Lead	Quarterly 30 Day Ave	1.5 μg/m3 No Standard	1.5 μg/m3 No Standard	No Standard 1.5 μg/m3
Nitrogen Oxides (measured as NO_2)	Annual 1-Hour	0.0543 ppm (100 μg/m3) No Standard	0.0543 ppm (100 μg/m3) No Standard	No Standard 0.25 ppm (470 μg/m3)
Ozone[e]	8-hour 1-hour	0.08 ppm (157 μg/m3) 0.12 ppm (235 μg/m3)	0.08 ppm (157 μg/m3) 0.12 ppm (235 μg/m3)	No Standard 0.09 ppm (180 μg/m3)
Particulate Matter (measured as PM_{10})	Annual 24-hour	50 μg/m3 150 μg/m3	50 μg/m3 150 μg/m3	30 μg/m3 50 μg/m3
Particulate Matter (measured as $PM_{2.5}$)[e]	Annual 24-hour	15 μg/m3 66 μg/m3	15 μg/m3 66 μg/m3	15 μg/m3 66 μg/m3
Sulfur Oxides (measured as SO_2)	Annual 24-hour 3-hour 1-Hour	0.03 ppm (80 μg/m3) 0.14 ppm (365 μg/m3) No standard No Standard	No standard No standard 0.50 ppm (1,300 μg/m3) No Standard	No Standard 0.04 ppm (105 μg/m3) No Standard 0.25 ppm (655 μg/m3)

a National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8- hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

b National Primary Standards: The levels of air quality necessary to protect the public health with an adequate margin of safety. Each state must attain the primary standards no later than 3 years after the SIP is approved by the USEPA .

c New federal 8-hour O_3 and fine particulate matter standards were promulgated by USEPA on July 18, 1997. The federal 1-hour O_3 standard continues to apply in areas that violated the standard.

d National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the SIP is approved by the USEPA.

e California standards for O_3, CO, SO_2 (1 and 24 hour), NO_2, suspended particulate matter – PM_{10}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the CCR.

f. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 millimeters (mm) of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibars); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

3.1.2.2 Regional Air Quality

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as "attainment" or "nonattainment." Based on the NAAQS, each state is divided into three types of areas for each of the criteria pollutants. The areas are:

- Those in compliance with the NAAQS (attainment);
- Those that do not meet the ambient air quality standards (nonattainment); and
- Those where a determination of attainment/nonattainment cannot be made due to a lack of monitoring data (unclassifiable – treated as attainment until proven otherwise).

Generally, areas in violation of one or more of the NAAQS are designated nonattainment and must comply with stringent restrictions until all the standards are met. In the case of O_3, CO, and PM_{10}, USEPA divides nonattainment areas into different categories, depending on the severity of the problem in each area. Each nonattainment category has a separate deadline for attainment and a different set of control requirements under the SIP.

The California Air Resources Board has regulatory authority for air pollution control in the State of California. Parts of nine counties comprise the San Francisco Bay Area Air Basin (SFBAAB) air quality control region (AQCR). According to federal regulations (40 CFR 81.305), all nine counties in the AQCR are better than national standards for SO_2, NO_2, and $PM_{2.5}$; unclassifiable/attainment for CO and PM_{10}; and nonattainment (not classified/moderate) for O_3. Travis AFB is located in the SFBAAB AQCR.

3.1.2.3 Baseline Air Emissions

Travis AFB

An air emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period of time, typically a year. Accurate air emissions inventories are needed for estimating the relationship between emissions sources and air quality. Quantities of air pollutants are generally measured in pounds (lbs) per year or tons per year (tpy). All emission sources may be categorized as either mobile or stationary emission sources. Stationary emission sources may include boilers, generators, fueling operations, industrial processes, and burning activities, among others. Mobile emission sources typically include vehicle operations.

The calendar year (CY) 2000 air emissions inventory summary for the SFBAAB AQCR, which includes reported permitted stationary, mobile, and grandfathered air emission sources, is presented in Table 3.1.2-2. Data in the table include Travis AFB emissions. Table 3.1.2-3 lists the emissions calculated for the baseline C-5 aircraft operations activities at Travis AFB.

Table 3.1.2-2 Baseline Air Emissions Inventory, San Francisco Area Air Basin Air Quality Control Region

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
AQCR CY 00 Totals	1,096,825	202,210	236,520	32,120	82,125

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. $PM_{2.5}$ included for information only. Data reflected as tpy.

Source: SFBAAB 2000

Table 3.1.2-3 Baseline Emissions from Aircraft Operations Activities, Travis AFB

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Airfield Operations	123.000	44.000	1,808.000	0.000	79.000
AGE Operation	97.535	3.898	1.414	0.015	0.101
Aircraft Trim/Power Checks	2.229	0.762	16.328	0.329	0.000
Total	222.764	48.660	1,825.742	0.344	79.101

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. Data reflected as tpy.

Source: USAF 2003h

Military Training Routes

The MTRs proposed for use occur within California, Nevada, and Oregon. Table 3.1.2-4 lists the baseline emissions inventory for the SFBAAB, as well as the attainment status for each AQCR. The emissions inventories for the counties in Nevada do not include emissions from mobile sources, only stationary sources. To ensure a more accurate comparison when accomplishing the environmental consequences analyses in Chapter 4, mobile emissions from California counties with similar populations and geographical settings were added to the emissions from Nevada counties.

Table 3.1.2-4 Baseline Air Emissions Inventory, Air Quality Control Regions Associated with Proposed Action Military Training Routes

AQCR	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)	Attainment Status
Mountain Counties Air Basin, CA CY01	252,982	20,666	35,525	1,310	45,687	Attainment
Sacramento Valley Air Basin, CA CY01	588,318	**99,317**	**95,393**	4,833	**97,013**	Nonattainment
Great Basin Valley Air Basin CY01	25,561	2,201	4,581	314	**314,710**	Nonattainment
Lake County Air Basin, CA CY01	38,318	3,110	4,997	245	5,537	Attainment
Northeast Plateau Air Basin, CA CY01	148,478	8,964	14,184	613	31,361	Attainment
North Coast Air Basin, CA CY01	190,209	20,407	22,849	1,219	30,788	Attainment
North Central Coast Air Basin, CA CY01	188,858	31,861	28,707	1,475	27,923	Attainment
San Joaquin Valley Air Basin CY01	812,862	**200,279**	**172,904**	16,673	**172,842**	Nonattainment
South Central Coast Air Basin, CA CY01	266,976	**45,359**	**56,433**	6,745	31,857	Nonattainment
Churchill County, NV CY99	13,989	2,716	2,161	120	426	Attainment
Douglas County, NV CY99	**16,250**	2,997	1,792	115	341	Nonattainment
Esmeralda County, NV CY99	2,658	725	106	28	502	Attainment
Humboldt County, NV CY99	8,268	10,421	820	6,859	680	Attainment
Lander County, NV CY99	4,205	788	841	49	279	Attainment
Lyon County, NV CY99	14,765	8,604	1,933	528	2,550	Attainment
Mineral County, NV CY99	4,211	788	841	445	378	Attainment
Nye County, NV CY99	15,427	3,084	2,159	646	3,948	Attainment
Pershing County, NV CY99	4,207	926	844	50	97	Attainment
Storey County, NV CY99	4,386	2,928	255	27	29	Attainment
Washoe County, NV CY99	**71,847**	**8,305**	**17,548**	1,037	859	Nonattainment
AQCR 190, OR CY 99	4,251	1,154	1,280	629	2,162	Attainment

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. Data reflected as tpy. Bold indicates pollutant for which air basin is nonattainment or maintenance. The emissions inventories for the counties in Nevada do not include emissions from mobile sources, only stationary sources. To ensure a more accurate comparison when accomplishing the environmental consequences analyses in Chapter 4, the mobile emissions from California counties with similar populations and geographical settings were added to the Nevada counties emissions.

Source: AirData 2003.

Noise

Aviation-related activities at Travis AFB dominate the acoustic environment. Equipment used during the facilities construction would also generate noise. Therefore, construction-related noise will be analyzed in addition to noise from aviation activity. Vehicular activity associated with airfield operations contributes little to the general background noise levels around the airfield. Thus, vehicle generated noise will not be analyzed.

The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. Sound varies over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for describing levels of sound. Decibels are expressed in logarithmic units to account for the variations in amplitude. On the decibel scale, an increase of 3 dB represents a doubling of sound energy. A difference on the order of 10 dB represents a subjective doubling of loudness.

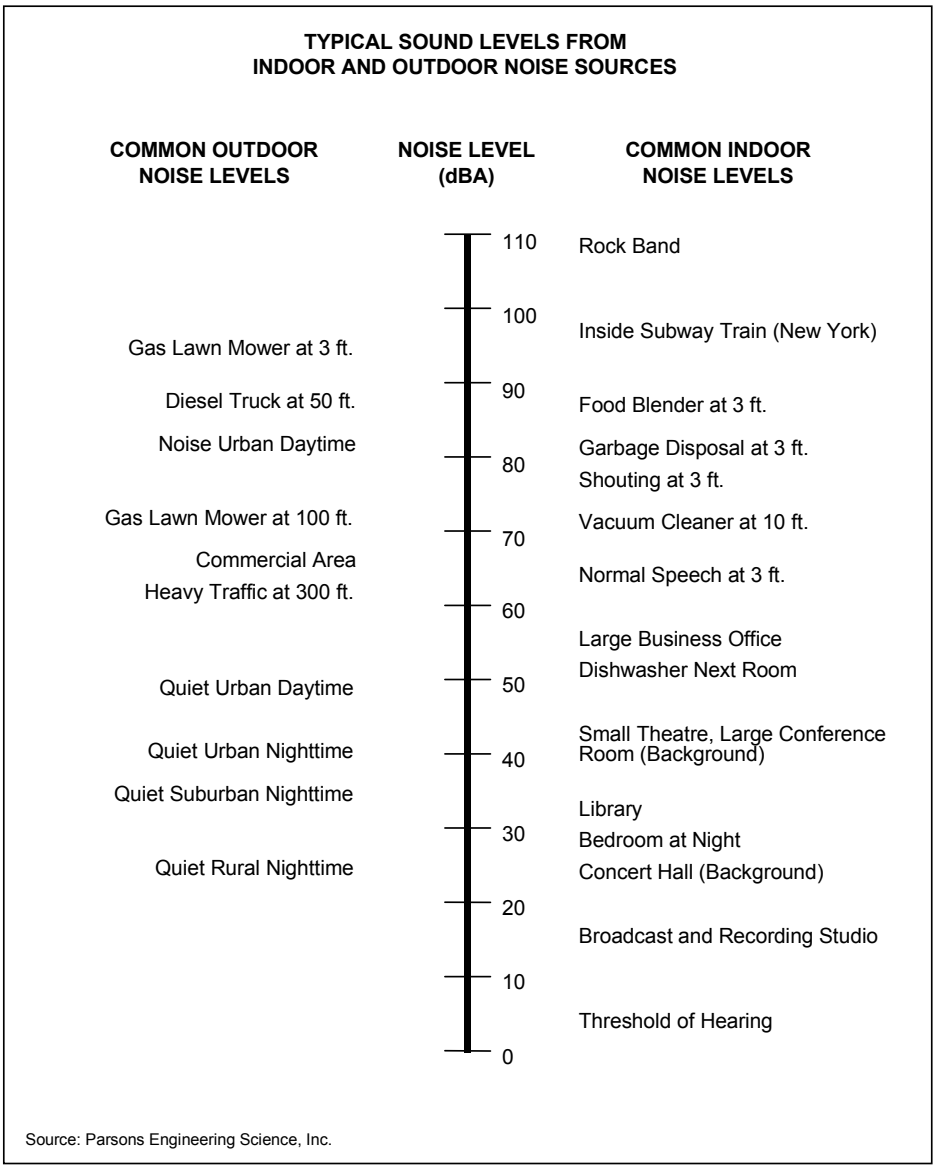
Different sounds have different frequency contents. Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent adjustment, called A-weighting, was developed to measure sound similar to the way the human hearing system responds. The adjustments in amplitude, established by the American National Standards Institute (ANSI S1.4 1983), are applied to the frequency content of the sound. Figure 3.1.3-1 depicts typical A-weighted sound pressure levels (dBA) for various sources. As indicated in the figure, 65 dBA is equivalent to normal speech at a distance of 3 feet.

Noise is defined as sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels change with time and the distance of the receptor from the noise source.

3.1.2.4 Noise Metrics and Analysis Methodology

A variety of metrics may be used to assess the impacts of sound. Depending on the specific situation, appropriate analysis may include single event or cumulative metrics. Single event metrics are used to assess the potential impacts of sound on structures and animals, and are sometimes used in the assessment of human effects. Sound Exposure Level (SEL), a single event metric, is commonly used to evaluate sleep disturbance. Averaged sound metrics are useful in characterizing the overall noise environment and are primarily used to analyze community (population) exposure to noise. Averaged sound exposure is expressed as the Day-Night Average Sound Level (DNL) metric or, in California, the Community Noise Equivalent Level (CNEL). The USEPA selected DNL as the uniform descriptor of averaged sound exposure. Subsequently, federal agencies, including the DoD, adopted DNL for expressing averaged sound. In practice, CNEL and DNL are often used interchangeably.

Figure 3.1.3-1 Typical A-Weighted Noise Levels



Single Event Sound Metrics

Although the Maximum Sound Level (L_{max}), the highest A-weighted sound level measured during an event, is the most easily understood descriptor for a noise event, alone it provides little information. Specifically, it provides no information concerning either the duration of the event or the amount of sound energy. Thus, SEL, which is a measure of the physical energy of the noise event and accounts for both intensity and duration, is used for single event noise analysis. Subjective tests indicate that human response to noise is a function not only of the maximum level, but also of the duration of the event and its variation

with respect to time. Evidence indicates that two noise events with equal sound energy will produce the same response. For example, a noise at a constant level of 85 dBA lasting for 10 seconds would be judged to be equally as annoying as a noise event at a constant level of 82 dBA and duration of 20 seconds (*i.e.,* 3 dBA decrease equals one half the sound energy but lasting for twice the time period). This is known as the "equal energy principle." The SEL value represents the A-weighted level of a constant sound with a duration of 1 second, providing an amount of sound energy equal to the event under consideration. By definition, SEL values are referenced to a duration of 1 second and should not be confused with either the average or maximum noise levels associated with a specific event. When an event lasts longer than 1 second, the SEL value will be higher than the L_{max} of the event. Table 3.1.3-1 provides SEL and L_{max} values for Travis AFB C-5 and KC-10 aircraft at a distance of 1,000 feet from the aircraft. The L_{max} would typically be 5 to 10 dBA below the SEL value or aircraft overflights. SEL is used in this report when discussing sleep disturbance and L_{max} is used for effects on structures in the single event noise analysis sections of this EA.

Table 3.1.3-1 Sound Exposure Level and Maximum Sound Level for Travis AFB Aircraft at 1,000 Feet from the Aircraft

Aircraft Type	Sound Exposure (SEL) (dBA)	Maximum Sound Level (L_{max}) (dBA)
C-5	114	106
KC-10	99	92

Note: At nominal takeoff thrust and airspeed and at a slant distance of 1,000 feet from the aircraft.

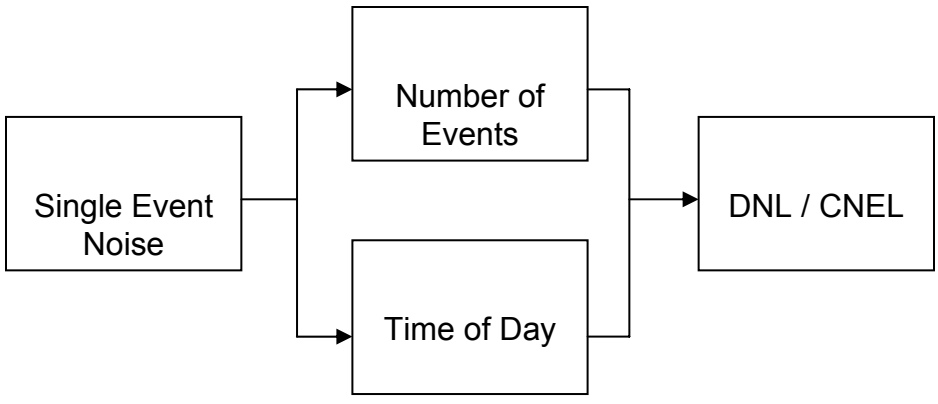
The frequency, sound level, and duration of aircraft flyover noise events depend on variables including aircraft type and model (engine type), aircraft configuration (*e.g.,* flaps, landing gear, *etc.*), engine power setting, aircraft speed, distance between the observer and the aircraft flight track, temperature, humidity, and altitude above sea level. Therefore, extensive noise data are collected for various types of aircraft/engines at different power settings and phases of flight. This extensive database of aircraft noise data provides a basis for calculation of average individual-event sound descriptors for specific aircraft operations at any location under varying meteorological conditions. The reference values are adjusted to any location by applying appropriate corrections for the variables.

Averaged Noise Metrics

Single event analysis has a major shortcoming -- single event metrics do not describe the overall noise environment. DNL and CNEL are measures of the total noise environment. DNL averages the sum of all aircraft noise producing events over a 24-hour period, with a 10 dBA upward adjustment added to the nighttime events (between 10:00 p.m. and 7:00 a.m.). CNEL adds a 5-dB upward adjustment to each aircraft noise producing event in the 7:00 p.m. to 10:00 p.m. period as well as the 10-dB adjustment to each event in the 10:00 p.m. to 7:00 a.m. period. Figure 3.1.3-2 depicts the relationship of the single event, the number of events,

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Figure 3.1.3-2 Day-Night Average A-Weighted Sound Level (DNL / CNEL)



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the time of day, and DNL or CNEL. This adjustment is an effort to account for increased human sensitivity to nighttime noise events. The summing of sound during a 24-hour period does not ignore the louder single events, it actually tends to emphasize both the sound level and number of those events. The logarithmic nature of the dB unit causes sound levels of the loudest events to control the 24-hour average.

DNL and CNEL are accepted units for quantifying annoyance to humans from general environmental noise, including aircraft noise. The Federal Interagency Committee on Urban Noise (FICUN) developed land use compatibility guidelines for noise exposure areas (FICUN 1980). Based on these FICUN guidelines, the FAA developed recommended land uses in aircraft noise exposure areas. The Air Force uses DNL (except for California where CNEL is used) as the method to estimate the amount of exposure to aircraft noise and predict impacts. Land use compatibility and incompatibility are determined by comparing the predicted DNL or CNEL level at a site with the recommended land uses.

Noise Analysis Methodology

The sound analysis methodology used for airfield operations in this EA is based on noise contours produced by the NOISEMAP noise model. NOISEMAP is a suite of computer programs developed by the Air Force to predict noise exposure in the vicinity of an airfield due to aircraft flight, maintenance, and ground run-up operations. Data describing flight tracks and flight profile use, power settings, ground run-up information by type of aircraft/engine, and meteorological variables are assembled and processed for input into NOISEMAP. The model uses this information to calculate SEL and DNL or CNEL values at points on a regularly spaced grid surrounding the airfield. A plotting program generates contour lines connecting points of equal DNL or CNEL values in a manner similar to elevation contours shown on topographic maps. Contours are generated as 5 dB intervals beginning at DNL 65 dBA, the maximum level considered acceptable for unrestricted residential use. While there is no technical reason why a lower level cannot be measured or calculated for comparison purposes, DNL 65 dBA:

- provides a valid basis for comparing and assessing community noise effects; and
- represents a noise exposure level which is normally dominated by aircraft noise and not other community or nearby highway noise sources.

In California, contours are generated beginning at CNEL 60 dBA, the level at which residential use is conditionally acceptable. The contours produced by NOISEMAP are used in the day-night average sound analysis sections in this EA.

3.1.2.5 Baseline Noise Analysis, Travis AFB

The primary source of noise in the vicinity of Travis AFB is airfield operations. Baseline noise conditions are based on the airfield operations shown on Table 2.4.1-1 (No Action Alternative). About 242.81 average daily airfield operations occurred at Travis AFB under the baseline condition. Approximately 13 percent of the operations occur during the evening (7:00 p.m. to 10:00 p.m.), while 9 percent occur during nighttime (10:00 p.m. to 7:00 a.m.). These operations and the resultant baseline noise environment are based on

airfield operations data collected in 2000 (USAF 2000d). Figure 3.1.3-3 shows the baseline condition aircraft ground tracks and Figure 3.1.3-4 depicts the noise exposure area for the baseline. Residences and public use facilities such as schools, libraries, hospitals, churches, and nursing homes are more sensitive to noise than those in other types of facilities because the activities that take place in these structures require lower sound levels and, for that reason, are used as specific analysis points. Table 3.1.3-2 lists the outdoor SEL and CNEL values for specific analysis points.

Table 3.1.3-2 Baseline SEL and CNEL from Airfield Operations at Specific Analysis Points, Travis AFB

			Highest SEL by Aircraft Type (dBA)			
Number	**Description**	**CNEL (dBA)**	**C-141[1]**	**C-5**	**KC-10**	**C-17[1]**
1	Base Hospital	59	83	88	NA	NA
2	High School and Middle School	54	80	86	NA	77
3	Base Housing	62	86	93	NA	NA
4	Fairfield High School	49	70	92	64	71
5	School	49	73	93	66	NA
6	Residential Area	56	86	90	80	82
7	Residential Area	52	71	89	70	76
8	Residential Area	54	84	94	80	82

1—Represents transient aircraft

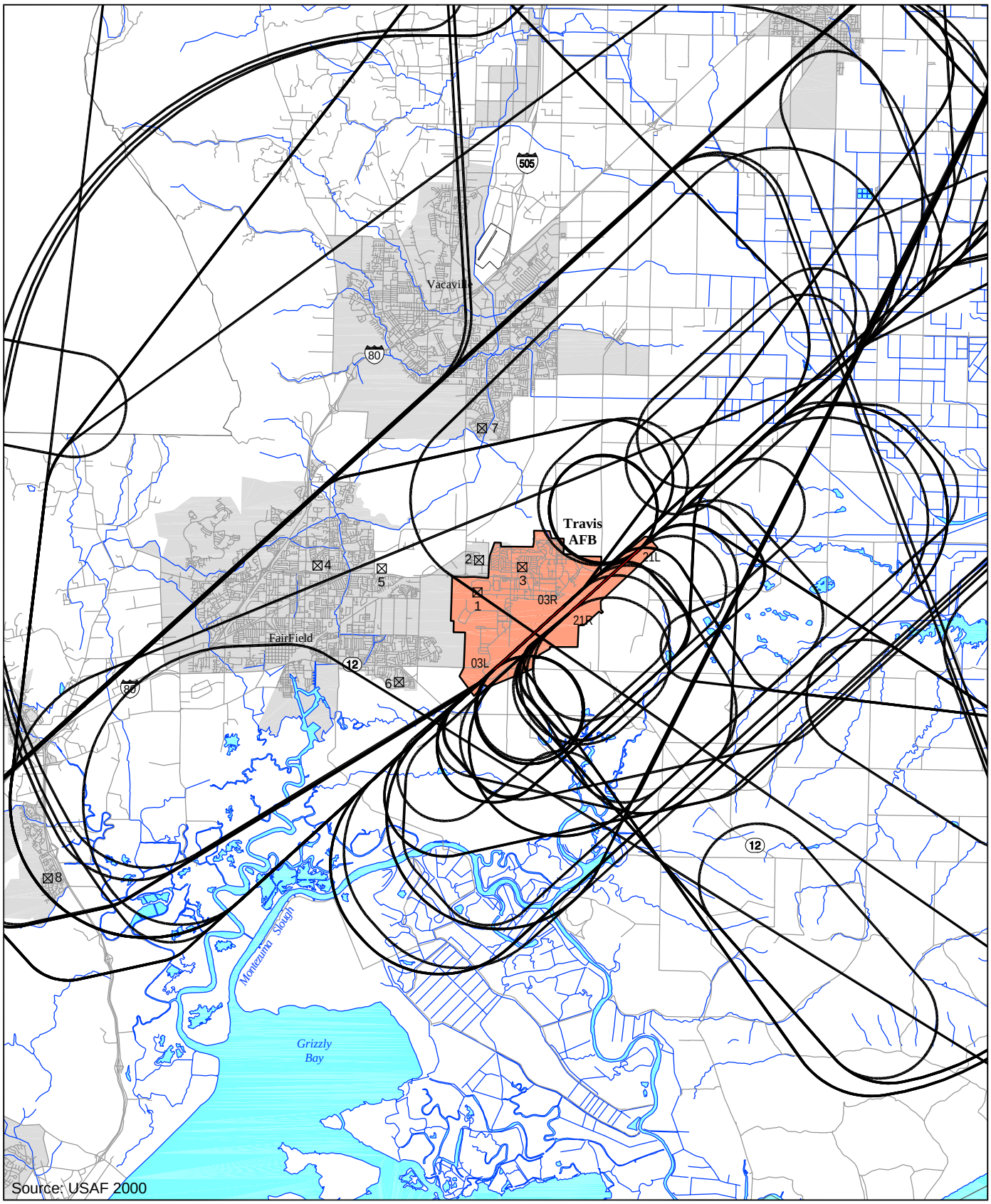
Note: NOISEMAP rank orders the SEL for the 18 noisiest flight track events affecting the analysis point. Thus, NA indicates that the particular aircraft type does not produce one of the 18 noisiest events for the point. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the CNEL for a point from the table to the CNEL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

Single Event Sound Analysis, Travis AFB

Single event analysis is conducted to evaluate sleep disturbance and effects on structures. Figures 3.1.3-3 and 3.1.3-4 show the eight specific analysis points identified for analysis in the area surrounding the airfield. These points are facilities that may be sensitive to noise from single aircraft flyover events.

Sleep Disturbance

Noise from low-flying aircraft arriving at and departing from an airfield at night may cause sleep disturbance. DNL and CNEL incorporate consideration of sleep disturbance by assigning a 10 dBA penalty to the SELs of nighttime noise events (10:00 p.m. to 7:00 a.m.). Additionally, CNEL adds a 5 dBA penalty for evening noise events (7:00 p.m. to 10:00 p.m. However, single noise events, not average sound levels, correlate better with sleep disturbance.



Travis Air Force Base

LEGEND

- Flight Track
- Runway
- Roadway
- Analysis Point
- Travis AFB

3 0 3

Miles

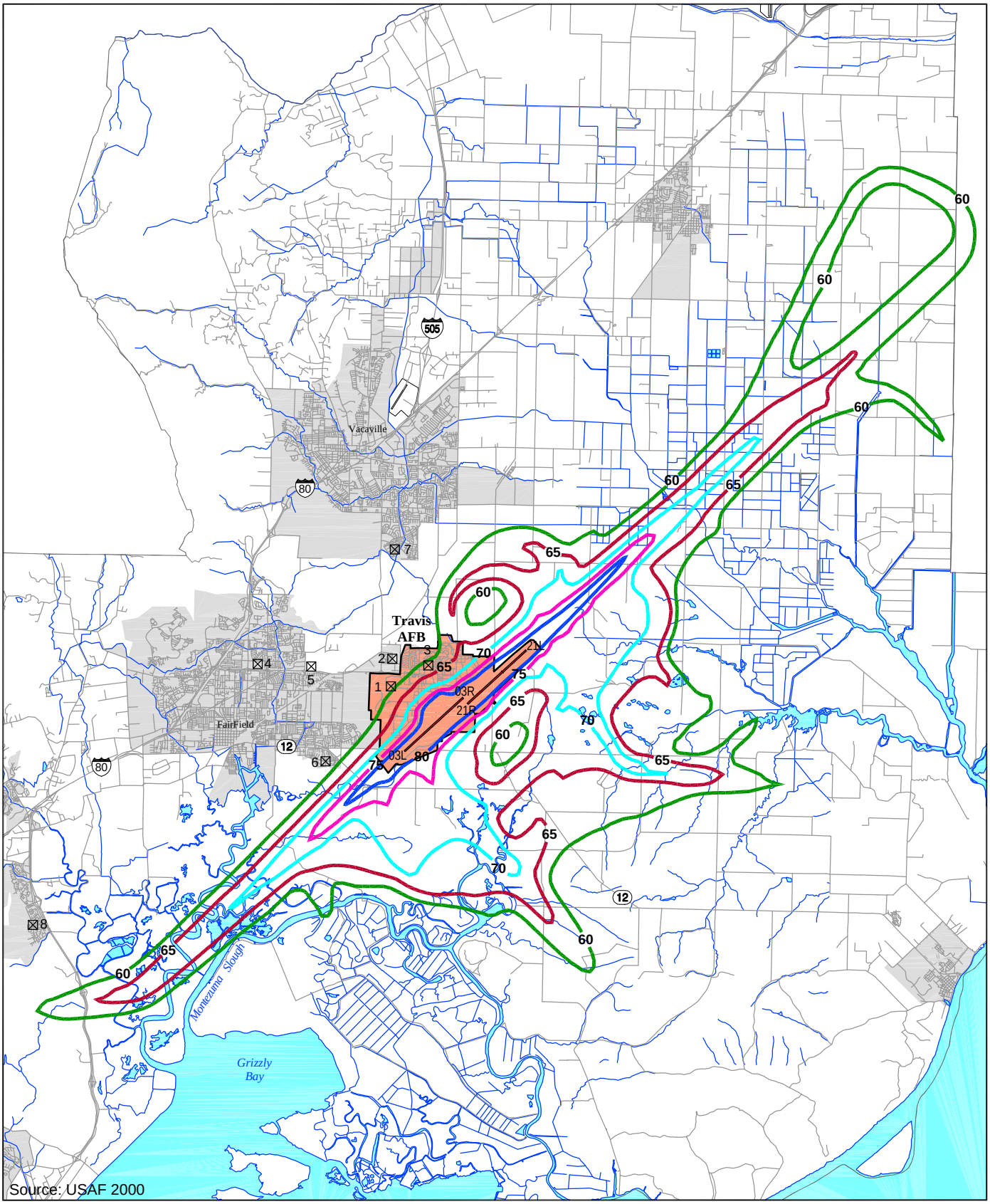
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Baseline Aircraft Ground Tracks Travis AFB

Figure 3.1.3-3

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Travis Air Force Base

LEGEND

- CNEL 60 dBA Contour
- CNEL 65 dBA Contour
- CNEL 70 dBA Contour
- CNEL 75 dBA Contour
- CNEL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- Travis AFB

19,000 0 19,000 Feet

N

Baseline Noise Contours Travis AFB

Figure 3.1.3-4

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Studies have estimated the percentage of awakenings that may be experienced by people exposed to different SELs. Based on those studies, the Federal Interagency Commission on Noise (FICON) in 1992 recommended use of an interim dose-response curve to predict the percentage of the exposed population expected to be awakened as a function of the exposure to single-event noise levels expressed in terms of SEL. Since the adoption of the interim curve in 1992, substantial field research has been completed using a variety of test methods at a number of locations. Data from these studies show a consistent pattern, with a smaller percentage of the exposed population expected to be behaviorally awakened than had been shown in laboratory studies.

The Federal Interagency Committee on Aviation Noise (formed in 1993 as recommended by FICON) now recommends a new dose-response curve for predicting awakening. Figure 3.1.3-5 compares the FICAN recommendation of 1997 to the FICON recommendation of 1992. FICAN takes the conservative position that, because the adopted curve represents the upper limit of the data presented, it should be interpreted as predicting the maximum percentage of the exposed population expected to be awakened. Based on this new position, it is estimated that outdoor SELs of 80 to 100 dBA could result in 4 to 10 percent awakenings in the exposed population. Noise must penetrate the residence to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dB for open windows and 25 dB for closed windows. Twenty dBA is conservatively used to estimate attenuation for a typical dwelling unit (USEPA 1974).

Effects of Noise on Structures

Possible noise-related impacts on structures should be considered in the context of accepted research results. The recent development of larger commercial and military aircraft has prompted research into the effects of noise vibrations on both modern and historic structures.

Some building materials are more sensitive than others to external pressures and induced vibrations. Windows with large panes of glass are most vulnerable. Plaster walls in frame buildings are susceptible to cracking. Components that are least likely to experience damage are masonry walls of stone, concrete block, adobe, or brick. Appropriate building design can also reduce the possibility of damage from vibration. Research has not proven categorically that old buildings are more vulnerable to vibration than newer buildings, but prudence dictates special consideration be given to unique structures of historical significance. Table 3.1.3-3 lists the effects of sound on structures.

Table 3.1.3-3 Effects of Noise on Structures

dBA	psf[a]	Effects Summary	
0-127	0-1	Typical community exposures	No damage to structures No significant public reaction
127-131	1.0-1.5	(generally below 2 psf)	Rare minor damage Some public reaction
131-140	1.5-4.0	Window damage possible, increasing public reaction, particularly at night	
140-146	4.0-8.0[b]	Incipient damage to structures	
146-171	8.0-144.0	Measured booms at minimum altitudes experienced by humans; no injury	
185	720.0	Estimated threshold for eardrum rupture (maximum overpressure)	
194	2,160.0	Estimated threshold for lung damage (maximum overpressure)	

psf = pounds per square foot
With the exception of window glass breakage, booms less than 11 psf should not damage "building structures in good repair" (Clarkson and Mayes 1972).

Source: Speakman 1992.

Day-Night Average Noise Analysis, Travis AFB

Figure 3.1.3-4 shows the CNEL noise contours for the baseline airfield operations condition at Travis AFB. The CNEL 60 dBA contour extends about 15 miles to the northeast of the airfield boundary, 11 miles to the southwest, 4 miles to the north, and 7 miles to the southeast in two places. The extensive areas of coverage to the north and southeast are due to the closed pattern aircraft tracks (see Figure 3.1.3-3).

Noise annoyance is defined by the USEPA as any negative subjective reaction to noise by an individual or group. Table 3.1.3-4 presents the results of over a dozen studies on the relationship between noise and annoyance levels. This relationship was suggested by Schultz (1978) and was reevaluated (Fidell *et al.* 1988) for use in describing the reaction of people to environmental noise. These data provide a perspective on the level of annoyance that might be anticipated. For example, 12 to 22 percent of people exposed on a long-term basis to DNL or CNEL of 65 to 70 dBA are expected to be highly annoyed by noise events. The study results summarized in Table 3.1.3-4 are based on outdoor noise levels.

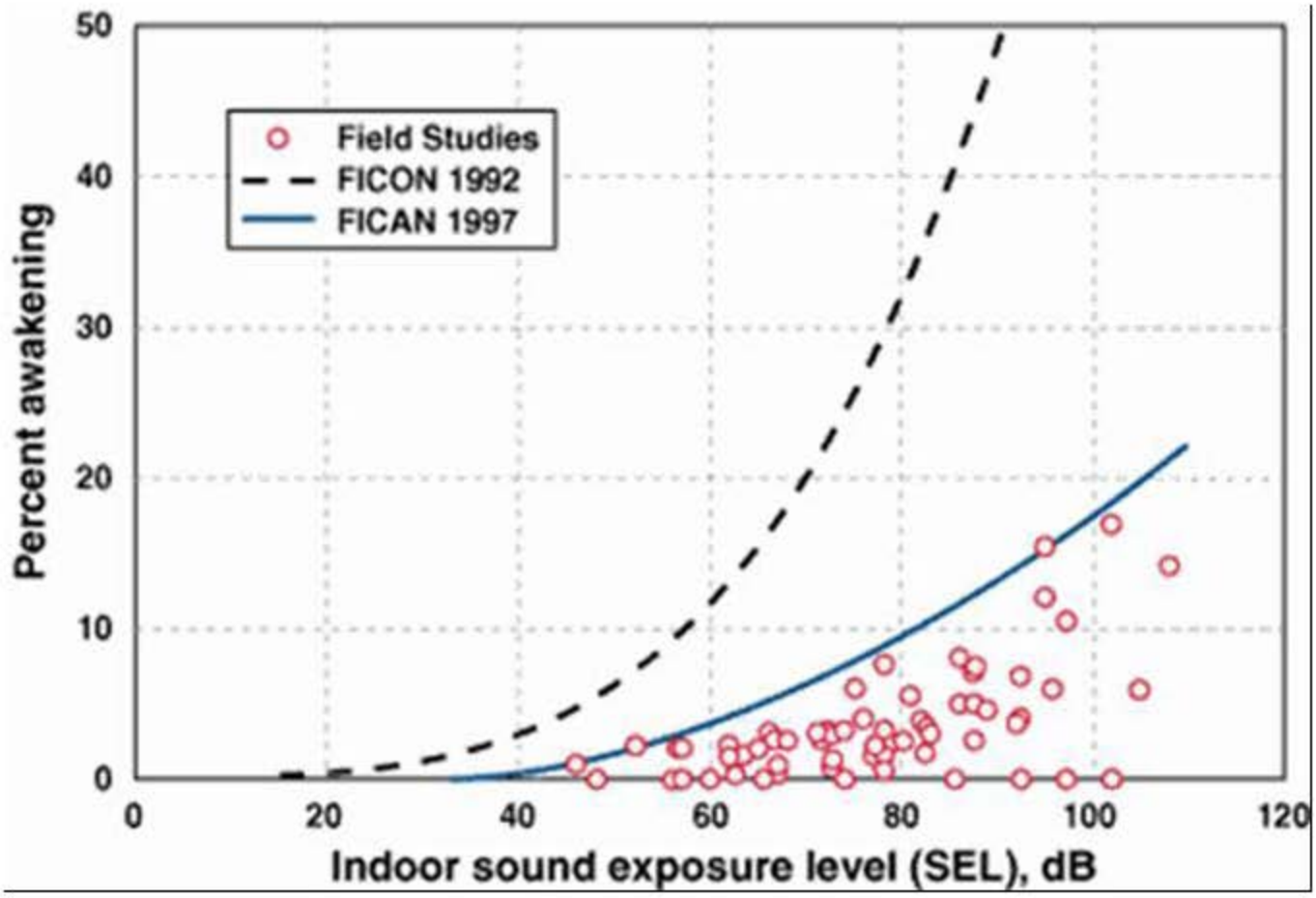
Table 3.1.3-4 Theoretical Percentage of Population Highly Annoyed by Noise Exposure

DNL or CNEL Intervals in dBA	Percentage of Persons Highly Annoyed
<65	<12
65-70	12-22
70-75	22-37
75-80	37-54
>80	61

Note: Noise impacts on individuals vary as do individual reaction to noise. This is a general prediction of the percent community highly annoyed based on environmental noise surveys conducted around the world.

Source: Adapted from Naval Air Station 1977

Figure 3.1.3-5 Indoor Sound Exposure Level (SEL) dB



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Table 3.1.3-5 lists the number of acres and number of on-Base people within the CNEL 60 dBA and greater noise exposure area for the baseline condition, as well as the estimated number of people who might be highly annoyed by noise at those levels. Table 3.1.3-6 lists the information for people living off-Base.

Table 3.1.3-5 Baseline On-Base Noise Exposure, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres	732	713	577	582	1,896	4,500
People	3,791	1,868	214	0	0	5,873
People Highly Annoyed	455	411	79	0	0	945

Note: Population data used to determine the number of people within a noise zone were obtained from the United States Census Bureau 2000 census. It was assumed that population was equally distributed within a census tract area to estimate affected population. Using the noise contour information, the number of acres of land in each noise zone (*i.e.,* CNEL 60-65 dBA, 65-70 dBA, 70-75 dBA, 75-80 dBA, and 80 dBA and greater) was divided by the number of acres of land in each census block to determine the portion of the census tract within each noise zone. The population total in each block-group was then multiplied by this ratio to estimate affected population within each zone. This process was used throughout the EA. People highly annoyed was determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Table 3.1.3-6 Baseline Off-Base Noise Exposure, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres	28,485	18,836	11,161	2,149	1,423	62,504
People	464	190	38	10	4	706
People Highly Annoyed	56	42	14	5	2	119

Note: People highly annoyed was determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Elevated noise levels can interfere with speech, cause annoyance or communication difficulties, and disrupt sleep. Based on a variety of studies, there is a good probability of frequent speech disruption at DNL or CNEL 75 dBA. This level produces ratings of "barely acceptable" for intelligibility of spoken communication (AIHA 1996).

3.1.2.6 Military Training Route Noise Analysis

Aircraft operations on an MTR are not as regular as airfield operations and exhibit substantial variation throughout the year. Particular training phases or exercises can exist for periods of weeks or months. Because of the differences in the levels of operations on MTRs and at airfields, a different noise descriptor, the onset rate-adjusted monthly day-night average A-weighted sound level (L_{dnmr}) was developed to assess noise on MTRs. It is based on an integration period equal to one calendar month with the highest number of monthly operations. L_{dnmr} is calculated similarly to DNL with a 10 dB upward adjustment factor for nighttime events. In addition, L_{dnmr} incorporates an onset rate adjustment for noise events

with an onset rate equal to or greater than 15 dB per second. This onset rate adjustment provides a noise penalty to account for increased intrusiveness due to the surprise factor of low altitude, high-speed aircraft. The Air Force recommends L_{dnmr} values be applied to the same interpretive criteria as DNL values (USAF 1997).

The ROUTEMAP computer program calculates the noise level on the ground along a low-level flight corridor or track such as a MTR. The information needed for each aircraft type is the number of daytime and nighttime operations during a month, nominal values for the airspeed, engine power setting, and altitude. The program computes the L_{dnmr}, DNL or CNEL, and equivalent sound level (L_{eq}) in dBA for ground positions located within 13 miles of the route centerline. The ROUTEMAP noise model calculates and presents the results based on a monthly average; that is, if there are only two operation days in a month, the model will average the two operation days over a typical 30-day month. Measurements on several low-level flight corridors (Plotkin and Croughwell 1986; Plotkin 1987) established that a Gaussian distribution in the horizontal plane is the distribution that best describes the spatial activity along an MTR. The impact of flight track dispersion in the vertical plane on sound exposure level has a minimal, and often negligible, effect compared with dispersion in the horizontal plane. For purposes of the present ROUTEMAP model, vertical dispersion is not considered; therefore, the aircraft tracks are distributed laterally at a constant altitude above the ground.

Table 3.1.3-7 lists the baseline operations on the MTRs proposed for use by Travis AFB C-17 aircrews under the Proposed Action. Figures 2.4.2-1, 2.4.2-2, and 2.4.2-3 show the location of the MTRs. Appendix B contains a more detailed figure depicting the location of each route.

As indicated in Table 3.1.3-8, the L_{dnmr} for baseline MTR operations ranges from a low of 34 dBA to a high of 62 dBA. Table 3.1.3-9 lists the SEL values for various aircraft for points directly below and lateral to the aircraft ground track. Both the L_{dnmr} and SEL (see Table 3.1.3-9) decrease as the distance between the receptor and the route centerline increases. The L_{dnmr} is a maximum of 5 dBA greater than the values stated in Table 3.1.3-8 at the points at which the MTRs intersect or when there are common route segments. Thus, the maximum L_{dnmr} for any route is about 67 dBA.

Table 3.1.3-7 Baseline Operations on Proposed Action Military Training Routes

		Operations	
Route	**Aircraft Type**	**Annual**	**Monthly**
IR-203	F/A-18	6	<1
IR-207	T-38, F-15, T-45	42	4
VR-202	F/A-18, T-38, S-3, EA-6B, AV-8B	56	5
VR-249	F/A-18, C-130, T-45, F-15, F-16, S-3, EA-6B	84	7
VR-1205	B-1, C-12, F-15, F-16	68	6
VR-1215	C-12, F/A-18	2	<1
SR-300/301	C-130, C-141	264	22
SR-311/359	N/A	0	0
IR-212	T-45, F/A-18	10	<1
IR-236	N/A	0	0
VR-201	F/A-18, T-38, F-5, S-3, F-15, T-45, AV-8B	228	19
VR-208	F/A-18, S-3, EA-6B	71	6
VR-1250	F/A-18, T-38, S-3, F-15, T-45, C-17	33	3
VR-1252	F/A-18, T-45, AV-8B, A-10	5	<1
VR1254	F/A-18, T-38, S-3, T-45, EA-6B	20	2
SR-381	N/A	0	0

Note: Monthly operations rounded to the nearest whole number. N/A=not applicable. Route not flown in FY02.

Sources: FAA 2003a; FAA 2003b; ANG 2003a; ANG 2003b; 3 MAW 2003; and USN 2003.

Table 3.1.3-8 Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Proposed Action Military Training Routes, Baseline Condition

Route	L_{dnmr} (dBA)	Route	L_{dnmr} (dBA)
IR-203	47	IR-212	43
IR-207	49	IR-236	NA
VR-202	56	VR-201	62
VR-249	59	VR-208	57
VR-1205	56	VR-1250	51
VR-1215	40	VR-1252	34
SR-300/301	46	VR-1254	52
SR-311/359	NA	SR-381	NA

Note: L_{dnmr} is represented for MTR operations at 300 feet AGL.
NA=route not flown in 2002 and L_{dnmr} would be 0.

Table 3.1.3-9 Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Proposed Action Military Training Routes, Baseline Condition

Aircraft	200 Feet	315 Feet	1,000 Feet	2,000 Feet	3,150 Feet
B-1	118	115	107	101	97
C-12	90	87	79	75	71
F-15	122	119	110	104	100
F-16	109	106	98	92	87
C-130	103	100	91	86	82
F/A-18	121	118	108	101	96
T-45	94	91	82	76	72
S-3	115	112	101	91	84
EA-6B	126	123	114	107	103
T-38	98	95	86	80	75
F-5	101	98	90	83	78
AV-8B	118	115	105	99	94
C-17	106	103	92	84	78
A-10	102	99	89	82	77

3.1.3 Hazardous Wastes, Hazardous Materials, and Stored Fuels

3.1.3.1 Hazardous Wastes

Unless otherwise exempted by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) regulations, Resource Conservation and Recovery Act (RCRA), Subtitle C (40 CFR Parts 260 through 270) regulations are administered by the USEPA and are applicable to the management of hazardous wastes. Hazardous waste must be handled, stored, transported, disposed, or recycled in accordance with these regulations.

The storage, handling, recycling, and disposal of hazardous wastes are subject to regulations under the RCRA of 1976 and its 1988 amendments. RCRA regulatory authority has been delegated to the state by the USEPA. The Travis AFB Hazardous Waste Management Plan (December 20, 1999) fulfills the requirements in Title 40, CFR Parts 260-270 and the CCR, Title 22, Parts 66264.13 and 66268.7(a), which establishes procedures to achieve and maintain regulatory compliance regarding accumulation, transportation, and disposal of hazardous waste.

Travis AFB is a RCRA large quantity generator, and generated 169,568 pounds of hazardous waste in FY 2000 for all activities (USAF 2002c). Hazardous waste generated on the Base includes flammable solvents, contaminated fuels and lubricants, stripping chemicals, waste oils, waste paint, absorbent materials, outdated materials, and asbestos. Approximately 95 percent of the total volume of hazardous waste generated is associated with aircraft

maintenance, transportation maintenance, equipment and facilities maintenance (USAF 1999e). Thus, approximately 161,090 pounds of waste were generated by these activities.

Travis AFB has one facility permitted for long term storage of hazardous wastes, the Treatment Storage and Disposal Facility (TSDF) at Bldg. 1365. Most hazardous waste at Travis AFB is collected in 55-gallon drums, characterized, stored for less than 90 days at various accumulation points on the Base, and then transported to the TSDF. Wastes stored at the TSDF are primarily waste petroleum products, spent solvents and spilled or outdated chemicals. The facility is permitted to store 51,600 gallons (Yuen 2003). The TSDF has the capacity to store 1,032 drums or the equivalent volume in other containers. The facility also has the capacity to store 15,000 gallons of recyclable oil and fuels. Wastes are removed from the TSDF by contract to an approved disposal site (USAF 2002c). The polychlorinated biphenyls (PCB) storage facility in Bldg. 956 is slated for closure.

3.1.3.2 Hazardous Materials

Hazardous materials are those substances defined by CERCLA (42 USC Section 9601, *et seq*.), as amended by the Superfund Amendments and Reauthorization Act (40 CFR 300-372), and the Toxic Substances Control Act (15 USC Section 2601, *et seq*.). The Solid Waste Disposal Act as amended by the RCRA (42 USC 6901, *et seq*.), and further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or to the environment when released or otherwise improperly managed.

Hazardous materials management at Air Force installations is established primarily by Air Force Instruction (AFI) 32-7080, *Pollution Prevention Program.* The AFI incorporates requirements of all federal regulations, other AFIs, and DoD Directives (DoDD), for reduction of hazardous material uses and purchases.

Travis AFB has an Integrated Contingency Plan that was prepared in 2003 in accordance with 40 CFR 112. The Base also has a Hazardous Material (HAZMAT) Plan, dated April 2003, that includes a hazards analysis for hazardous materials at specific locations throughout the installation. These plans cover hazardous materials emergency planning, training, response, and reporting, and would be used to respond to spills on the Base.

The purchase and use of hazardous materials on Travis AFB is managed by the Mission Support Group which operates two Hazardous Materials Pharmacies (Hazmarts). All hazardous materials enter the Base through the Hazmarts. Base functions request the hazardous material and quantity from the Hazmarts and the material is delivered to or picked up by the requesting function. No hazardous material may be used until it is entered into the Environmental Management Information System and approved for use. Under this system, Hazmarts personnel maintain positive records for the location of the containers, from issue to return and ultimate disposal.

3.1.3.3 Stored Fuels

Travis AFB accomplishes numerous fueling operations to support aircraft and vehicle operation. The majority of fuel handled at Travis AFB is aviation jet fuel (JP-8). Other activities include the receiving, storage and dispensing of petroleum, oils or lubricants (POL) including on-Base consumption of diesel fuel and gasoline by motor vehicles, consumption of containerized lubricants and other petroleum products, and consumption of diesel fuel for emergency power generation (USAF 1999g).

The 60th Logistics Readiness Squadron manages bulk fuel storage and transfer operations. JP-8 is received from Kinder Morgan Energy Partners at a transfer rate of 40,656 gallons per hour via pipeline. Fuel transfer usually occurs three times per week and takes approximately 12 hours per session. Transfers are monitored and inspected by squadron personnel. Diesel fuel is delivered to Travis AFB via tank trucks, typically with an 8,000-gallon capacity (USAF 1999g).

JP-8 is stored in aboveground and underground storage tanks on Travis AFB. The Bulk Fuel Storage Area (Area F), located along Hangar Avenue near the intersection of Ragsdale Street, can store approximately 6,930,000 gallons of JP-8 (in four aboveground storage tanks) and 310,000 gallons of diesel fuel. All above ground storage tanks in the Bulk Fuel Storage Area have secondary containment (USAF 2002c). Tanks and containment dikes at Area F are being repaired and replaced (Musselwhite 2002). All JP-8 passes through the Bulk Fuel Storage Area, from where it is distributed to hydrant fueling systems at Areas B, C, and G. Total JP-8 storage capacity is 9,181,000 gallons when the storage associated with the fuel hydrant systems is considered (USAF 2002c).

The Travis AFB Integrated Contingency Plan identifies the procedures, methods, equipment and other requirements to prevent the discharge of oil from non-transportation-related facilities into or upon the waters of the United States. The Contingency Plan includes a spill history, inspection records and requirements, training procedures, and improvement projects.

3.1.4 Water Resources

Water resources at Travis AFB encompass surface water, groundwater, floodplains, and wetlands. Travis AFB lies in the Union Creek watershed, which drains into the Suisun Marsh, then to the Suisun Bay, and ultimately into the San Francisco Bay.

3.1.4.1 Surface Water

The major surface water feature on Travis AFB is Union Creek, which originates 3 miles north of the Base (USAF 2000a). Union Creek spans a distance of 2.5 miles on the Base. Union Creek enters the Base from the north and exits the Base at its southwestern corner. Two branches of Union Creek enter Travis AFB from the north. These are formed from the divergence of Union Creek approximately 1 mile north of the Base.

The west branch of Union Creek is a drainage channel that enters Travis AFB along the northwest boundary of the Housing Area and crosses a small commercial area near the main gate of the Base. The west branch is part of Drainage Area II and has been channeled as an open ditch for most of its route across Travis AFB.

The east branch of Union Creek enters at the northeast corner of Travis AFB and flows directly into North Gate Park Pond, or "Duck Pond," adjacent to the north gate of the Base. The east branch then travels underground and emerges as Union Creek (riparian) in the southern part of the Base (USAF 2001c).

After exiting Travis AFB, Union Creek flows 1.6 miles before discharging into Hill Slough, which is a seasonally and semi-permanently flooded wetland (USAF 2000a).

McCoy Creek is a smaller drainage that receives water from storm drains. This creek flows under the runway and discharges through Outfall II into Union Creek (USAF 1999g).

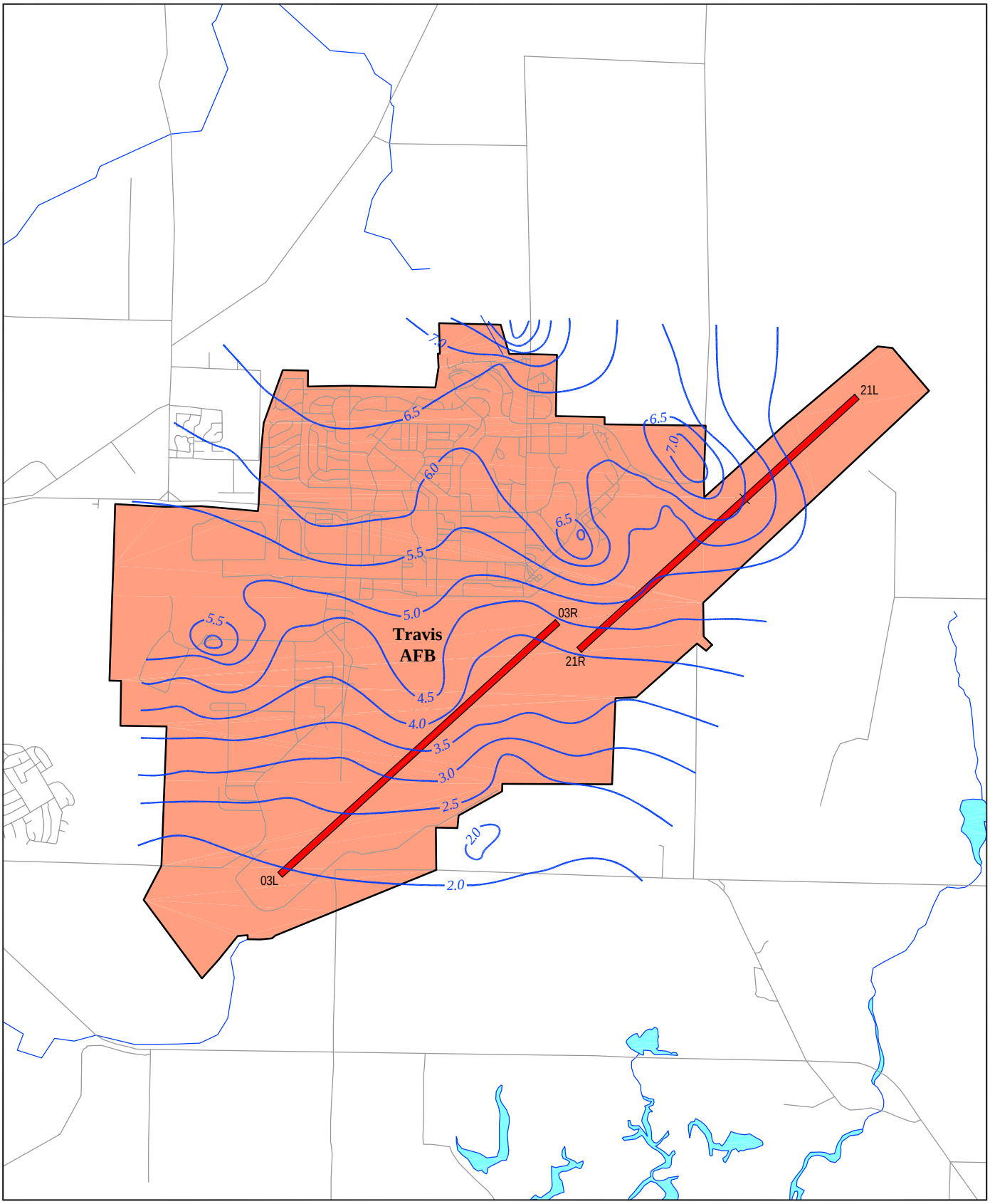
The Federal Clean Water Act (PL 92-500, as amended) provides for delegation of certain responsibilities in water quality control and water quality planning to the states. The goal of the CWA of 1977 (33 USC 1251 *et seq*.) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Water quality standards are designed to establish surface water standards consistent with public health and public enjoyment, and propagation and the protection of fish, shellfish, and wildlife.

The National Pollutant Discharge Elimination System (NPDES) program is an element of the Clean Water Act. The NPDES program requires that an NPDES permit be obtained for any discharges into surface waters of the United States. An NPDES general storm water permit is required for construction areas greater than 1 acre for storm water discharges associated with construction activity. The Air Force has an SWPPP for Travis AFB. This plan identifies the drainage patterns and discharge points on the installation and is updated every 3 years.

3.1.4.2 Groundwater

Primary water-bearing deposits in the region surrounding Travis AFB are coarse-grained sediments (sand and gravel) within the alluvium (USAF 2000a). The Base is not underlain by extensive water-bearing materials compared to the deposits of the Great Valley (Putah Plain Area) to the northeast and Fairfield/Green Valley to the west. This is evidenced by the absence of major water supply wells in the Base vicinity and the presence of extensive well fields to the northeast and west. Figure 3.1.5-1 shows groundwater elevation contours on the Base. Groundwater occurrence at the Base is in shallow deposits and flows to the south into the Suisun Marsh, south of the Base, to Suisun Bay, and ultimately into the San Francisco Bay, generally following the surface topography (USAF 2001c).

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Travis Air Force Base

LEGEND

2.0 Groundwater Contour

Runway

Roadway

4,000 0 4,000

Feet

N

742463 TR—GW.DWG

Groundwater Elevation Contours

Figure 3.1.5-1

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Depth to the unconfined groundwater aquifer in the southwestern portion of Travis AFB varies seasonally from about 5 feet below ground surface (bgs) to 30 feet bgs. Bedrock units beneath the Base do not yield groundwater of usable quantity or quality. Groundwater recharge occurs from direct infiltration of rainfall and runoff through local stream and creek beds (USAF 2000a).

Recharge to the shallow groundwater table is from the foothills of Cement Hill to the north, in-channel infiltration from the creeks' draining area (*i.e.,* Union Creek, Denverton Creek, and smaller unnamed creeks northwest of the Base), and through direct precipitation (USAF 2001c).

Groundwater monitoring is being conducted at Travis AFB through the Environmental Restoration Program (ERP), formerly known as the Installation Restoration Program (IRP), a program through which the Air Force conducts investigations and develops appropriate remediation strategies to clean up contamination (USAF 2000a). The unconfined aquifer has been affected by releases of hazardous substances from historic activities at the Base and are addressed through the ERP.

3.1.4.3 Floodplains

Travis AFB has two areas within the 100-year flood zone. The western branch of Union Creek is 8.6 acres in size and serves as a drainage channel approximately 15 to 25 feet wide, 15,000 feet long, and from 4 to 15 feet deep. The channel runs south along the west boundary of Travis AFB in the Base housing area for 4,300 feet. It then proceeds along the east edge of the David Grant Medical Center (DGMC) and continues south for 3,500 feet. The channel then turns southeast and follows Ragsdale Street for 6,400 feet before it crosses under Ragsdale Street. It then runs south until it ends at the edge of Taxiway 30, a distance of approximately 800 feet. This channel fills with water during heavy rains and is the main drainage for a large area of the west side of the Base (USAF 2001c).

The second floodplain is the approximately 25-acre riparian zone along Union Creek. The creek enters the Base from the north through the center of the Patriot Village housing area and flows into the pond in North Gate Park. From there, it runs underground toward the south and is discharged to the surface on the south side of the flight line just west of Bldg. 1175. From there, it flows southwest parallel to the flight line and exits the Base at the southwest corner. The distance traveled is approximately 17,000 feet; the width and depth vary from 10 to 15 feet and from 4 to 15 feet, respectively (USAF 2001c).

3.1.5 Biological Resources

This Subchapter characterizes vegetation and wildlife found in the area of the Proposed Action on Travis AFB, including a discussion of threatened and endangered species. Management and conservation of listed endangered and threatened species on military installations are required by the Endangered Species Act (ESA), DoD Instruction 4715.3 *Environmental Conservation Program* (3 May 1996) and AFI 32-7064 (*Integrated Natural*

Resources Management). Under terms of the ESA, candidate species have no protection; however, the USFWS and NMFS typically request that impacts be avoided wherever possible. This is particularly pertinent to species where listing as threatened or endangered is imminent. The Air Force manages and integrates natural resource considerations into the installation mission in the Integrated Natural Resources Management Program (INRMP) for each installation. Detailed descriptions of installation natural resource assets, characteristics, and conservation management approaches are provided in the INRMP for Travis AFB, which was updated in 2001 (USAF 2001c). The Travis AFB INRMP was approved by the USFWS on April 16, 2003.

Numerous biological resource inventories and analyses have been conducted at Travis AFB, including both general and species-specific or habitat-specific studies (BioSystems Analysis 1994; Weston 1995; Earth Tech 2000a, 2000b, 2001; USAF 2001c). These ecological baselines are used for planning purposes; integration of conservation considerations into mission activities as required under the Sikes Act and DoDD 4700.4 (dated 24 January 1989); and development and implementation of a variety of conservation management approaches. The findings of these surveys are summarized herein.

Travis AFB consists of approximately 5,200 acres, excluding off-site areas, located halfway between the coastal zone and interior valley provinces of California. The climate is Mediterranean with cool, wet winters, and warm, dry summers. Annual mean precipitation for the installation is 17.5 inches, of which 84 percent occurs between November and March. Elevations at the Base range from approximately 20 to 100 feet above sea level. Landscape topography is gently rolling grasslands, interspersed with wetlands, vernal pools, and small tributaries that drain into Suisun Slough, an arm of the Suisun Bay, which is a reach of San Francisco Bay.

The predominant use of Travis AFB and its environs is agriculture and open space, although minor industrial, residential, and outdoor recreational land uses are also present. Historic agricultural and livestock grazing practices have degraded native biotic communities such that native perennial grasslands are now dominated by exotic annual species. A relatively large number of vernal pools remain in the region, including on Travis AFB. A Nature Conservancy tract, the Jepson Prairie Preserve, established to protect vernal pools, is located 4 miles east of Travis AFB.

3.1.5.1 Travis AFB

Vegetation

Plant taxonomy and nomenclature used in this evaluation follow Abrams (1923, 1944, 1951), Abrams and Ferris (1960), Buckingham *et al.* (1995), Muniz (1959), Hickman (1993), and Hitchcock *et al.* (1969). Franklin and Dyrness (1973), Holland (1986), Zeiner *et al*. (1988; 1990a; 1990b), and Sawyer and Keeler-Wolf (1995) were reviewed for vegetation (biotic) community considerations.

Historically, Travis AFB and surrounding areas were dominated by grasslands composed of perennial bunch grasses, annual grasses, herbaceous annuals, and scattered forbs (Holstein 2000). Well-drained upland soils supported oaks, perennial bunch grasses, annual grasses, and herbaceous broad-leaf annuals. Streams leading to Suisun Bay consisted of willows, cottonwoods, cattails, reeds, sedges, and salt-tolerant grass and weeds.

The biotic communities on Travis AFB may be broadly distinguished into terrestrial and aquatic types, each with differing flora and fauna. Aquatic community associations at Travis AFB are classified into: riparian wetlands, wet meadows, vernal pools, and lacustrine. Terrestrial community associations are: annual grass/forbs, ruderal-disturbed, riparian corridors, and urban. A brief description of major community associations, based on Weston (1995) and USAF (2001c) follows.

Discing vegetation near runways, taxiways, ramps, and service areas for fire safety and the Bird Air Strike Hazard (BASH) program has converted native grasslands into monotypic stands of non-native species. These land-use practices have had an adverse impact on many vernal pools and wetlands. Due to historic land-use practices, relatively pristine habitats are restricted to small areas, typically associated with vernal pools and riparian corridors along Union Creek. Significant portions of Travis AFB are paved or otherwise impervious surfaces (*i.e.,* runways, taxiways, ramps, roads, buildings, and parking lots).

Plants that have been inventoried on Travis AFB include 53 families, 159 genera, and 252 species. Woody plants constitute 13 species (BioSystems Analysis 1994; Weston 1995; Earth Tech 2000a, 2000b, 2001; USAF 2001c). Composites and grasses are the most dominant families, comprising one-third of all species identified. Exotic species constitute 48 percent (120 species) of the installation flora. The predominant community types are ruderal-disturbed and urban.

Travis AFB contains areas of relatively pristine vernal pools and vernal swales. Vernal pools, despite being a minor habitat type, account for up to 44 percent (110 species) of the total number of species on Travis AFB.

Riparian Wetland. Riparian wetlands are the ecotone between in-stream aquatic and upland communities along Union Creek. Union Creek is about 2½ miles long, entering the installation along the northern border and exiting at the southwest corner. Union Creek divides into two branches north of Travis AFB. The west branch is channelized, concrete-lined or contained within culverts (nearly one-half mile under the runway and taxiways); with sluggish flows except during storm events. The east branch enters North Gate Park Pond. Traveling underground, the creek emerges on the east and south side of the runway as Union Creek (riparian corridor). Union Creek is highly modified and managed.

Willow and pepperweed dominate this community. Aquatic plant species in Union Creek, principally the eastern branch, include duckweed, American water milfoil, and pondweed.

Union Creek supports an abundance of fish such as western mosquitofish, fathead minnow, hitch, threespine stickleback, largemouth bass, rainwater killifish, and aquatic invertebrates that attract birds such as mallard, great egret, and great blue heron. The stickleback and hitch are native while all other fish species are introduced.

Wet Meadow. Scattered throughout the installation uplands are shallow depressions that contain seasonal wet meadows. Mesic soils support a variety of grasses and forbs which are maintained by mowing or discing, or used as pasture for cattle and horse.

Exotic grasses dominate this community, including Italian ryegrass, ripgut grass, and wild oat. Other species include coyote thistle, popcorn flower, downingia, pacific meadow foxtail, and filaree.

Vernal Pool. Vernal pools and vernal swales are found throughout the installation, consisting of shallow depressions or small, shallow ponds that fill with water during the rainy season, drying out during spring and summer. Vernal pool waters are maintained by durapan made of impermeable clay or other hardpan material, or bedrock (BioSystems Analysis 1994). Vernal swales, which may also be seasonally inundated, are ecologically and floristically related to vernal pools; however, vernal swales serve as water collection sources for vernal pools.

Vernal pools and vernal swales are absent where soils have been disturbed, such as the flightline, industrial and residential areas of Travis AFB. Most high-quality vernal pools are located in the northwest portion of the installation. About 322 sites are identified as containing vernal pool vegetation. These sites are either single, isolated pools, or hydrologically-connected pool clusters, varying in size up to one acre.

Plant species identified in the vernal pools include a mix of native and exotic species, including Pacific meadow foxtail, saltgrass, annual hairgrass, Contra Costa Goldfields, round woolly marbles, popcorn flower, downingia, meadow barley, coyote thistle, hyssop, spike rush, flowering quillwort, alkali milk vetch, and San Joaquin spearscale (Earth Tech 2000a, 2000b and 2001). Vernal pools may provide habitat for several species of crustaceans, most of which are protected under the Endangered Species Act (BioSystems Analysis 1994). Vernal pools and vernal swales may also support a variety of amphibians.

The USFWS has proposed designating vernal pool ecosystems throughout northern California and Oregon as critical habitat for 11 vernal pool species (USFWS 2002a). Travis AFB, in its entirety, has been proposed for designation as critical habitat due to the presence of the Vernal Pool Fairy Shrimp and the Contra Costa Goldfields. The Base is awaiting the final decision by USFWS concerning which portions, if any, of the installation will actually be designated as critical habitat.

The proposed road alignment north of Ellis Drive, west of Ragsdale Street and east of the fuel tank farm, crosses a vacant field containing several vernal pools. These pools were previously delineated and inventoried for threatened, endangered and sensitive species of plants and animals (Earth Tech 2000a, 2000b, 2001). Vernal pools Numbers 151 and

152 have been identified by Earth Tech (2000a) and are within the proposed road realignment. They are defined as low quality and high quality, respectively, and comprise a total 0.515 acre. Additionally, there is another 0.485-acre within 250 feet of the edge of the proposed road realignment (Earth Tech 2000a). Based on these and previous studies, the presence or absence of species listed under the Endangered Species Act are questionable (USFWS 2002a). A study is being accomplished to verify the conditions of the vernal pools using strict seasonal protocols. The estimated completion date is November 2003.

Lacustrine. North Gate Park Pond is a man-made, open-water community created by impounding Union Creek. This impoundment is 2.2 surface acres in size with an average depth of 5 feet. Associated with North Gate Park Pond is a well-maintained recreational park with mowed turf-grasses and managed landscaping for shade and cover for picnics.

Aquatic plants include rooted, submerged, and floating macrophytes such as duckweed, American water-milfoil, and leafy pondweed, and some emergent species such as cattails (Earth Tech 2000b). A recreational flat-water fishery is maintained including game fish: large-mouth bass, bluegill, channel catfish, and green sunfish.

Other small ponds supporting a lacustrine community are located in the southeast portion of the installation. Aquatic-upland ecotones of these ponds are dominated by grasses.

Annual Grass/Forb. Grasslands are located primarily in the west and southwest portions of Travis AFB and comprise approximately 1,735 acres. The majority of the grasslands are subject to mowing and discing as part of the BASH program and provide firebreaks. Grasslands are also utilized for the agricultural outleasing program for livestock grazing.

The dominant species are exotic and include: soft chess, Italian ryegrass, mouse-tail fescue, filaree, wild oat, ripgut grass, and Harding grass. Most abundant wildlife species are red-winged blackbird, ring-necked pheasants, northwestern fence lizard, gopher snake, and deer mouse.

Ruderal-Disturbed. The largest habitat component of Travis AFB is ruderal-disturbed, particularly the southeastern area adjacent to Union Creek and the installation hunting area (USAF 2001c). Ruderal vegetation consists of exotic grasses and forbs. Generally, this biotic community occurs in built-up (urban) areas such as road shoulders and road fills, construction sites, runways and taxiway medians, fire training area, or other sites subjected to recurrent soil disturbances including as mowing, discing, and livestock grazing. Woody forbs and shrubs are characteristically marginally taller than maintained landscaped lawns near residences and installation buildings.

Community species composition is mainly coyote brush (a native species), blue gum, California pepper tree, black locust, yellow star thistle, cut-leaved geranium, and annual grasses such as wild oat and ripgut grass.

This community type supports a wide variety of invertebrate and vertebrate species, including, but not limited to: Pacific tree frog, northwestern fence lizards, gopher snake, black-tailed jackrabbit, deer mouse, house mouse, California ground squirrel, red-winged blackbird, killdeer, and western meadowlark.

Riparian Corridor. Forming a narrow, lineal habitat ecotone between uplands and aquatic habitats are riparian corridors. Riparian corridors with tree species exists mostly along Union Creek and edges of North Gate Park Pond.

Dominant understory species includes wild-rye, pepperweed, Harding grass, and saltgrass. Canopy cover is provided by willows, few coyote bush, and woody scrub/shrub species. Emergent species such as cattails may be present. Typical wildlife includes Pacific tree frog, western pond turtle, western fence lizard, gopher snake, and California red-sided garter snake (USAF 2001c).

Mallards, red-winged blackbirds, Brewer's blackbird, cliff swallows, barn swallows, and violet-green swallows breed within or near riparian corridors. Migratory Neotropical birds utilize riparian corridors seasonally as pathways to and from breeding/wintering areas (Adams and Dove 1989; Small 1994).

Urban. This habitat is associated with nonnative landscaped vegetation, predominantly irrigated residential lawns throughout the housing and building areas in the north-central portion of Travis AFB. These areas are periodically subject to disturbance such as mowing. Representative wildlife includes song sparrow, tricolored blackbird, killdeer, house sparrow, western harvest mouse, and California ground squirrel (USAF 2001c).

Wildlife

The prevalent wildlife on Travis AFB include mammals (particularly small mammals), birds, reptiles and amphibians, fish and aquatic invertebrates (USAF 2001c). Scientific nomenclature and common names for wildlife follows: butterflies, Miller (1992); fish (Robins *et al*. 1991); herpetofauna (amphibians and reptiles), Committee on Standard English and Scientific Names (2001); birds, American Ornithologists' Union (1983, 1998); and mammals, Wilson and Cole (2000).

Mammals. Twenty-nine species of mammals occur on Travis AFB (USAF 2001c). The deer mouse, house mouse, and western harvest mouse are the most common small mammal species. The deer mouse is most common in annual grasslands. The house mouse is most common in the riparian area. Larger mammals include black-tailed jackrabbit, California ground squirrel, opossum, striped skunk, feral cats, coyote, red fox, muskrat, long-tailed weasel, raccoon, mink, beaver, and bobcat. Beaver have dammed Union Creek on occasion. California ground squirrels, black-tailed jackrabbits, and feral cats are common throughout the Base.

Birds. A total of 153 species are known or suspected to occur on Travis AFB, including 35 nesting species (USAF 2001c). Twelve species are classified as species of

special concern (to include the burrowing owl by the California Department of Fish and Game (CDFG), USFWS, or California Partners in Flight.

The red-winged blackbird was the most common species observed in all habitats, except for riparian and residential areas, where the mallard was most common. A survey conducted on Travis AFB also recorded the greatest number of birds in the Union Creek riparian habitat. The greatest diversity of species was observed in the ecotone of ruderal-disturbed and wetlands.

Reptiles. Fourteen reptile species have been identified on Travis AFB (USAF 2001c). The northwestern fence lizard and gopher snake were abundant in a wide range of habitat types including annual grass-forb, ruderal-disturbed, and riparian habitats of Union Creek. Grazing land-use of any intensity in any habitat type reduced the occurrence of the gopher snake and fence lizard. Riparian habitat types were regularly occupied by western pond turtles and California red-sided garter snake.

Amphibians. Six species of amphibian have been identified as occurring at Travis AFB (USAF 2001c). Weston identified the Pacific tree frog as the only common amphibian on Travis AFB. This species is primarily associated with riparian and early successional habitat types. Egg masses and tadpoles of Pacific tree frogs were commonly observed in standing waters of ditches adjacent to roads.

A single sighting of the California tiger salamander has been documented. The salamander is listed as a Candidate (Endangered in Santa Barbara and Sonoma Counties) under the Endangered Species Act.

The introduced bullfrog is suspected on Travis AFB. This species, due to its highly competitive and predatory nature, would displace other amphibian species, especially disturbance-sensitive species like the tiger salamander.

Fish. Ten fish species have been identified on Travis AFB (USAF 2001c). Four recreational species of fish occur in North Gate Park Pond: large-mouth bass, bluegill, green sunfish, and channel catfish. In 2001, Chinook salmon was first documented on Travis AFB.

Aquatic Invertebrates. Benthic and vernal pool invertebrates are the two groups of aquatic species found on Travis AFB. The predominant macrobenthic organisms identified in the sediment samples of Union Creek include oligochaetes and chironomids, both organisms occurring in areas of high organic debris is indicative of degraded water quality from siltation and organic pollution possibly from agricultural runoff originating north of Travis AFB. A total of 33 different invertebrate taxa have been reported from the sampling of 121 vernal pools in the northwest portion of Travis AFB (USAF 2001c).

3.1.5.2 Military Training Routes

The MTRs proposed for use by Travis AFB C-17 aircrews cover a broad geographic range in three western states including California, Nevada, and Oregon. Most of the routes are in California and Nevada, with one MTR that would fly over southern Oregon.

Vegetation

In the lowlands of California, and also in the Fallon, Reno, and Klamath Falls area, native plant communities have been replaced by urban landscape, farms, and rangeland. The diversity of landforms and geography covered by the routes support a number of natural plant communities and wildlife habitats, which are categorized into the California, Desert, and Great Basin floristic provinces.

Plant communities of the California Floristic Province overflown by the proposed MTRs are diverse and numerous. Those of the Cascade Range Region include: black oak forest; westside and eastside ponderosa pine forests; and northern juniper woodland. In the Central Western California Region, where the MTRs would cross the Coast Ranges, plant communities include: non-native grassland; coast live oak forest; blue oak woodland; valley oak woodland; gray pine woodland; northern mixed chaparral and various other chaparrals; and central coast riparian scrub (Holland 1986).

Within the Great Central Valley Region, in those areas not covered by farmland, native plant communities in the area of the Proposed Action include: coastal and valley freshwater marsh; valley sacaton grassland; valley sink scrub; non-native grassland; northern claypan and hardpan vernal pools; and Great Valley riparian forests (Holland 1986).

Plant communities of the North Coast Ranges and Klamath Mountains of Northwestern California Region include: bald hills prairie; northern maritime chaparral; northern coastal scrub; northern mixed chaparral and various other chaparrals; redwood forest; red alder riparian forest; north coast riparian scrub; coast live oak forest; black oak forest; mixed evergreen forest; Douglas-fir forest; and western hemlock (Holland 1986).

Within the Desert Floristic Province of southern California and Nevada, the MTRs occur over several plant communities native to a variety of elevations from the mountains and alluvial fans down to the floor of the basins and sinks. Major ranges include the Argus, Avawatz, Coso, Inyo, Panamint, and Providence mountains. The intervening valleys to be overflown include the Antelope, Owens, Panamint, Saline, and Silurian valleys. The principal plant communities of the Desert Mountains Region are: Mojavean piñon woodland; rabbitbrush scrub; and Joshua tree woodland at the highest elevations. At slightly lower elevations of the Mojave Desert Region, blackbush scrub is the dominant plant community. Below the elevation of blackbush scrub, the Mojave creosote bush scrub is the predominant vegetation type. At the lowest elevations of the Desert Floristic Province, the MTRs would fly over desert saltbush scrub, shadscale scrub and desert sink scrub plant communities (Holland 1986).

Plant communities of the Great Basin Floristic Province include many forest, wetland, scrub and steppe associations. These are indigenous to several of the major mountains ranges, lakes, and intervening basins, valleys, and sinks of the region including the Black Rock Desert, Carson Sink, Clan Alpine Mountains, Hart Mountain, Mono Lake, Pine Forest Range, Pyramid Lake, Reese River Valley, Smoke Creek Desert, Smokey Valley, Shoshone Mountains, Surprise Valley, Sweetwater Mountains, Toiyabe Range, Walker Lake, and Warner Mountains.

On the Modoc Plateau, the proposed MTRs cross extensive forests and shrublands of the lava plains east of the Cascade Crest, wetlands surrounding several inland lakes including Clear Lake, Honey Lake, Goose Lake, and Lake Abert, and the grassland-dominated steppe of broad inland valleys and mountain slopes. Plant communities include: Great Basin mixed scrub; Great Basin grassland; transmontane alkaline and freshwater marshes; and Modoc-Great Basin riparian scrub (Holland 1986).

Within the White and Inyo Mountains Region the MTRs would overfly subalpine sagebrush scrub; Mojavean piñon woodland; and shadscale and blackbush scrubs. Several of the MTRs overfly the Lahontan Basin Section, which lies to the north and east of the Reno and Tonopah sections. Mountain ranges of this section tend to be lower, and the landscape is dominated by broad basins, alluvial flats and playas such as the Carson Sink. These playas and sinks are vegetated in large part by the little greasewood-shadscale plant community. Cottonwood gallery forests line the Truckee, Carson, and Walker Rivers. At the higher elevations, big sagebrush and Utah juniper predominate, but pinyon pine is absent (Cronquist *et al.* 1972).

To the east, the Tonopah Section contains broad valleys and alluvial fans covered mostly by shadscale with black sagebrush, big sagebrush, pinyon pines, and Utah juniper in the mountains. Sagebrush and shadscale vegetation covers most of the basin floors, with the latter species occupying most of the broad valleys (Cronquist *et al.* 1972).

Wildlife

The MTRs cross a wide elevational and climatic range of floristic provinces, representing a diverse complex of biological communities and ecosystems. These seral and climax ecosystems host a rich diversity of wildlife, including listed species. MTRs would overfly wildlife assemblages of the Great Basin (Great Basin Floristic Province), Cascades (Vancouverian Floristic Province), Central Valley and Sierra Nevada (Californian Floristic Province). These areas are generally described by Verner and Boss (1980), Kricher and Morrison (1993 and 1998), and Rockwell (1998).

Most of the area of the MTRs is arid or semiarid with precipitation (rain and snow) an environmental limiting factor for both plants and wildlife. Generally, wildlife species diversity and richness increase disproportionately to the small area covered by interior wetlands and riparian corridors (Thomas *et al.* 1979). However, even within this generalization, dramatic exceptions occur. The west slope of the Cascades and Coast Range

routinely receives 60 to 100 inches of rain annually, while the east slope (Great Basin) routinely receives less than 15 inches annually.

The MTRs would also overfly a multitude of protected and ecologically sensitive natural areas, principally in California but also including sites in Nevada and Oregon. These include Bureau of Land Management (BLM) lands including BLM National Conservation areas and BLM Wilderness areas, National Forests and Wilderness areas, National Parks, National Recreation Areas, National Wildlife Refuges, State Parks, State Recreation Areas, State Reserves, and State Game Refuges. Regulations at the federal and state level protect wildlife from aircraft noise and/or regulate airspace over public lands, parks, and preserves (see Subchapter 3.1.11.2). The protected natural areas are listed in Table 3.1.6-1.

3.1.5.3 Threatened, Endangered, and Special Status Species

The Endangered Species Act recognizes that many species of fish, wildlife, and plants are in danger of, or threatened with, extinction. The ESA established a national policy that all federal agencies should work toward conservation of these species. The Air Force complies with the mandates of the ESA by identifying endangered and threatened species, and critical habitats or Air Force lands, and implementing programs for the conservation of these species, in coordination with the USFWS.

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action

Protected Natural Area	Major Activities	Military Training Route															
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
Armstrong Redwoods State Reserve	Public recreation, wildlife viewing.		X														
Black Mountain Wilderness	Public recreation, hunting, wildlife viewing.									x							
Death Valley National Park	Activities include wildlife viewing sightseeing, picnicking, camping, auto touring, horseback riding, biking, and swimming.			x	x					x	X						
El Dorado National Forest	Public recreation, hunting, wildlife viewing.														X	x	X
Fremont National Forest	Public recreation including hang gliding, fishing, wildlife viewing.														X		
Grass Valley Wilderness	Public recreation, wildlife viewing.				x												

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action (…*continued*)

Protected Natural Area	Major Activities	Military Training Route															
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
Hart Mountain National Antelope Refuge	Public recreation, wildlife viewing.														x		
Hollow Hills Wilderness	Public recreation, hunting, wildlife viewing.			x													
Humboldt Wildlife Management Area	Public recreation, wildlife viewing.		x			x	x					x		x		x	
Inyo Mountain Wilderness	Public recreation, wildlife viewing.				x												
Inyo National Forest	Public recreation, wildlife viewing.				x												
Kelso Dunes Wilderness	Public recreation, wildlife viewing.			x													
Klamath National Forest	Public recreation, wildlife viewing.											x					
Lake Oroville State Recreation Area	Public recreation, fishing, swimming, boating, wildlife viewing.		X														

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action (…*continued*)

Protected Natural Area	Major Activities	Military Training Route															
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
Lassen National Forest	Public recreation, wildlife viewing.		X									x					
Los Padres National Forest	Public recreation, fishing, hunting, wildlife viewing.	x							X								
Manly Peak Wilderness	Public recreation, wildlife viewing.									x							
Mendocino National Forest	Public recreation, fishing, wildlife viewing.		X				X								X		
MODOC NATIONAL FOREST	Public recreation including hang gliding, fishing, hunting, wildlife viewing.													x	X		
Mojave National Preserve	Auto touring, biking, bird watching, camping, hiking, horseback riding, hunting, wildlife viewing.			x							X						
Morro Bay State Park	Public recreation, fishing, wildlife viewing.	x															

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action (…*continued*)

Protected Natural Area	Major Activities	Military Training Route															
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
Piper Mountain Wilderness	Public recreation, wildlife viewing.									x							
Plumas National Forest	Public recreation, fishing, wildlife viewing.		x				x					x					
Redwood National Park	Activities include Auto touring, biking, bird watching, boating, camping, fishing, hiking, horseback riding, kayaking, scuba diving, snorkeling, swimming, whitewater rafting, wildlife viewing											x					
Rodman Mountains Wilderness	Public recreation, hunting, wildlife viewing.			x													
Salinas River National Wildlife Refuge	Public recreation, fishing, hunting, wildlife viewing.	x															

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action (…*continued*)

Protected Natural Area	Major Activities	Military Training Route															
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
San Simeon State Park	Public recreation, fishing wildlife viewing.	X							X								
Sequoia National Forest	Public recreation, wildlife viewing.				x												
Shasta National Forest	Public recreation, fishing, hunting, wildlife viewing.											X			X		
Sheldon National Wildlife Refuge	Public recreation, wildlife viewing.														X		
Six Rivers National Forest	Public recreation, wildlife viewing.											X					
Sonoma Coast State Beach	Public recreation, fishing, surfing, wildlife viewing.		X														
Stanislaus National Forest	Public recreation, fishing, wildlife viewing.														X		
Surprise Canyon Wilderness	Public recreation, wildlife viewing.									X							
Sylvania Mountains Wilderness	Public recreation, wildlife viewing.									X							

Table 3.1.6-1 Protected Natural Areas Underlying Military Training Routes for the Proposed Action (…*continued*)

Protected Natural Area	Major Activities	Military Training Route														
		IR-203	IR-207/208	IR-212	IR-236	VR-201	VR-202	VR-208	VR-249	VR-1205	VR-1215	VR-1250	VR-1252	VR-1254	SR-300/301	SR-311/359	SR-381
Tahoe National Forest	Public recreation, fishing, wildlife viewing.															X	
Toiyabe National Forest	Public recreation, fishing, wildlife viewing.					X		X						X	X	X	X
Trinity National Forest	Public recreation, fishing, hunting, wildlife viewing.														X		
Willow Creek-Lurline Wildlife Management Area	No public access		X														

Source: American Automobile Association (1996); DeLorme (1995, 1996)

Note: Proposed MTRs that are separated by a slash indicate one route is the reverse of the other.

Travis AFB

Prior to conducting on-site reconnaissance, a list of threatened, endangered and sensitive plants and wildlife was prepared. The USFWS, NMFS, and CDFG were contacted (directly or indirectly via Internet databases) requesting information on threatened, endangered, or sensitive species or other special-status species within Travis AFB. The lists provided by USFWS, NMFS, and CDFG form the basis for further environmental evaluation. Additionally, the *California Natural Diversity Data Base* (CDFG 2002), and *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society [CNPS] 2001) were reviewed to identify rare plant species within the area of the Proposed Action.

Species with federal listing on Travis AFB include one endangered, one threatened, two candidates, and five Species of Concern. Table 3.1.6-2 identifies threatened and endangered species that may occur on Travis AFB.

Vegetation

The endangered Contra Costa Goldfields is the only protected plant species under the ESA documented on Travis AFB (Earth Tech 2000a, 2000b, 2001). Due to the proximity of the threatened Colusa grass and endangered Solano grass in Solano County, these species may be present but remain undocumented on Travis AFB.

Three vernal pool-obligate species are listed as rare by the CNPS (CNPS 2001): Contra Costa goldfields, San Joaquin spearscale, and alkali milkvetch. The spearscale and milkvetch are listed as federal species of concern (CDFG 2002).

Wildlife

Birds and Mammals. A variety of listed species occur in Solano County, but due to species-specific habitat requirements and the lack of suitable habitat at Travis AFB, these species do not occur on the Base. Repeated biological inventories and ecological studies have not identified any threatened, endangered, or candidate bird or mammals species on Travis AFB. Four federal Species of Concern have been documented on Travis AFB: loggerhead shrike, western burrowing owl, long-billed curlew, and rufous hummingbird.

Reptiles and Amphibians. The California tiger salamander is known from a single specimen found dead in a parking lot. It may have been transported by a vehicle from another location as repeated surveys have not documented this species at Travis AFB. Suitable habitat is significantly degraded due to exotic species, channelized waterways, and the potential presence of the bullfrog.

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Table 3.1.6-2 Special Status Species Occurring or Potentially Occurring on Travis AFB

Common Name	Scientific Name	Federal Status	State Status	CNPS Status	Habitat Requirements
Plants					
Contra Costa goldfields	*Lasthenia conjugens*	FE	None	List 1B	Drying borders of vernal pools and seasonally wet grasslands. Generally abundant in northwest corner of the Base and at southwest end of main runway.
Brittlescale	*Atriplex depressa*	None	None	List 1B	Grows in alkaline and clay soils below 500 feet. Scattered among vernal pools in northwest corner of the Base.
San Joaquin (valley) saltbush	*Atriplex joaquiana*	FSC	None	List 1B	Found in seasonally wet alkaline habitats, such as alkaline grasslands, below 1,000 feet. Occurs in northwest corner of the Base.
Alkali milk vetch	*Astragalus tener* var. *tener*	None	None	List 1B	Grows in seasonally moist areas with alkaline or adobe clay soil such as alkaline vernal pools, grasslands and playas, at elevations below 500 feet. Found scattered in vernal pools, northwest corner of the Base.
Amphibians					
California tiger salamander	*Ambystoma californiense*	FC	None	-	Grasslands and open oak woodlands and temporary ponds. One dead California Tiger Salamander was identified on the Base.
Birds					
Loggerhead shrike	*Lanius ludovicianus*	FSC	None	-	Grasslands and open meadows. Identified on the Base.
Western burrowing owl	*Athene cunicularia hypugea*	FSC	CSC	-	Grasslands, sometimes found in man-made structures such as storm drains and beneath cement and asphalt structures. Identified on the Base.
Long-billed curlew	*Numenius americanus*	FSC	CSC	-	Large vernal pools, temporary aquatic habitats. Identified on the Base.
Rufous hummingbird	*Selasphorus rufus*	FSC	None	-	Eucalyptus groves. Identified on the Base.
Fish					
Chinook salmon - Central Valley fall/late fall-run	*Oncorhynchus tshawytscha*	FC	SE	-	In 1999, designated as threatened for all naturally spawned spring-run, from the Sacramento San Joaquin River mainstem and its tributaries. First documented on the Base in 2001.
Invertebrates					
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	None	-	Found in vernal pools, sometimes found in a variety of temporary aquatic habitats such as roadside ditches. Adults and eggs found in vernal pools on Base.

Source: Modified from USAF 2001c
CSC = California Special Species of Concern
FC = Listed as a candidate proposed to be listed as threatened or endangered by the federal government
FE = Listed as endangered by the federal government
FP = Fully Protected
FSC = Listed as Species of Concern by the federal government
FT = Listed as threatened by the federal government
List 1B = Plants rare, threatened, or endangered in California or elsewhere
ST = Listed as threatened by the state government
SE = Listed as endangered by the state government

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The threatened giant garter snake, a riparian-obligate species, is known nearby in Solano County, but has not been documented on Travis AFB. Also, the threatened California red-legged frog is documented in Solano County but not the Base.

Fish. Pacific salmon, including steelhead, are anadromous fish. Anadromous defines species that move from the sea (saltwater) to fresh water for reproduction. Salmon and anadromous trout are most noted for their life cycle history that entails hatching in cool headwater tributaries of large river systems and moving out to saltwater as young fish (Groot and Margolis 1991; Moyle 2002).

Each of the species of Pacific salmon and trout has genetically distinct populations (runs), termed an evolutionarily significant unit (ESU), associated with major watersheds or tributaries. Under the ESA, the ESU serves as an alternative definition of distinct population segments (NMFS 2002a). Due to differing life history strategies and conservation threat, each ESU is treated as a separate species for administrative purposes under the Act. Of two ESUs of Chinook salmon; Central Valley spring-run (threatened) and Central Valley fall/late fall-run (candidate), only the latter is present on Travis AFB. Steelhead Central Valley ESU, is listed as Threatened and present elsewhere in Solano County. Steelhead could eventually occur on Travis AFB as populations recover.

Historically, Union Creek on Travis AFB was intermittent, with flows corresponding to seasonal wet periods. When Travis AFB was established, there was a need to manage and control groundwater and surface runoff, which led to the channelization of Union Creek. The west branch of Union Creek has been significantly degraded from natural conditions (USAF 2001c). Historic records do not document Pacific salmon or trout as occurring in Union Creek (NMFS 2002b, 2002c).

Only the Chinook salmon fall/late fall-run, a candidate species, has been identified as occurring on Travis AFB. The proposed stream crossings of Union Creek are approximately 1 mile from sites with Chinook salmon. Recent hatchery stocks of Chinook salmon may be the source of fish recently observed in Union Creek on both side of the runway according to CDFG biologists (Holmes *comm*. March 18, 2003). Salmon restoration and conservation are complicated by displacement of native fish (natural-spawning) by hatchery-reared fish (Moyle 2002).

Suitable habitat for salmon is absent in Union Creek (Bjornn and Reiser 1991). Union Creek lacks the gravel substrate, shade trees, predictable and/or adequate flows, and stable temperatures required to maintain a healthy salmon fishery. It is not expected that salmon would establish or use this creek in a successful manner until substantial improvements to Union Creek are made.

Invertebrates. Only the threatened vernal pool fairy shrimp has been documented as present at Travis AFB (Earth Tech 2000a). Other protected vernal pool crustaceans, the endangered vernal pool tadpole shrimp and endangered Conservancy fairy shrimp may be present but remain undocumented.

Other listed invertebrate species occurring in Solano County that may be present are the threatened Valley elderberry longhorn beetle and threatened Delta green ground beetle.

Military Training Routes

Threatened and endangered species that may potentially occur within the MTRs in California, Oregon and Nevada have been identified for the Proposed Action. In California, the California Endangered Species Act (CESA) prohibits "take" of endangered and threatened species. "Take" is defined as hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. The CESA requires state agencies to comply with CESA, including protection and recovery and to promote species conservation.

The State of Oregon maintains a sensitive animal species list as policy to reflect the Oregon Endangered Species Rules. Plants are afforded protection by the Oregon Department of Fish and Wildlife (ODFW) under Oregon Regulatory Statutes. In accordance with these rules, species can be classified as threatened or endangered and steps taken to recover them. Nevada protects plants declared by the State Forester Fire Warden, to be threatened with extinction pursuant to the Nevada Revised Statutes.

Special status plant and wildlife species are those afforded special recognition by state or federal agencies, or non-government organizations (ODFW 1997; CNPS 2001; Nevada Natural Heritage Program 2001). These species are generally considered unique, rare, threatened, or endangered due to declining or limited populations or loss of habitat. This may include, or overlap with federal or state-listed species. Tables 3.1.6-3 and 3.1.6-4 list species with a high probability of occurring.

Table 3.1.6-3 Federally Listed Threatened and Endangered Wildlife Species Within the Military Training Routes for the Proposed Action in California, Nevada, and Oregon

Federally Listed Threatened And Endangered Wildlife	IR-203	IR-207/208	VR-202	VR-249	VR-1205	VR-1215	SR-300/301	SR-311/359
Amargosa Vole						X		
Arroyo Toad				X				
Bald Eagle	X	X	X	X	X	X	X	X
Behren's Silverspot Butterfly		X	X					
Blue Whale	X	X						
Blunt-Nosed Leopard Lizard	X							
Brown Pelican	X	X	X	X				

Table 3.1.6-3 Federally Listed Threatened and Endangered Wildlife Species Within the Military Training Routes for the Proposed Action in California, Nevada, and Oregon *(…continued)*

Federally Listed Threatened And Endangered Wildlife	IR-203	IR-207/208	VR-202	VR-249	VR-1205	VR-1215	SR-300/301	SR-311/359
California Freshwater Shrimp		X						
California Least Tern	X	X		X				
California Red-Legged Frog	X	X	X	X			X	
California Tiger Salamander (Sonoma County Race)		X						
Carson Wandering Skipper		X	X					
Chinook Salmon (California Central Valley Spring)	X	X	X				X	X
Chinook Salmon (California Coastal Run)	X	X	X	X				
Chinook Salmon (Winter Sacramento River Run)	X	X	X				X	
Coho Salmon (California and Oregon Population)	X	X	X	X				
Coho Salmon (Central California Coast Population)	X	X		X				
Conservancy Fairy Shrimp	X							
Cui-Ui		X	X					
Desert Dace							X	
Desert Tortoise					X	X		
Freson Kangaroo Rat	X							
Giant Garter Snake	X	X	X				X	X
Giant Kangaroo Rat	X							
Green Sea Turtle	X	X	X	X				
Guadalupe Fur Seal	X	X	X	X				
Humpback Whale	X	X						
Iotis Blue Butterfly			X					
Lahontan Cutthroat Trout		X	X				X	
Least Bell's Vireo	X				X	X		
Leatherback Sea Turtle	X	X	X	X				
Light-Footed Clapper Rail								
Loggerhead Sea Turtle	X	X	X	X				
Longhorn Fairy Shrimp	X							
Lost River Sucker							X	
Marbled Murrelet		X	X					
Modoc Sucker							X	

Table 3.1.6-3 Federally Listed Threatened and Endangered Wildlife Species Within the Military Training Routes for the Proposed Action in California, Nevada, and Oregon *(…continued)*

Federally Listed Threatened And Endangered Wildlife	IR-203	IR-207/208	VR-202	VR-249	VR-1205	VR-1215	SR-300/301	SR-311/359
Mohave Tui Chub					X	X		
Morro Bay Kangaroo Rat	X							
Morro Shoulderband Snail				X				
Mountain Yellow-Legged Frog			X				X	X
Northern Spotted Owl		X	X				X	
Sacramento Splittail	X		X				X	X
San Joaquin Kit Fox	X							
Santa Cruz Long-Toed Salamander	X							
Shasta Crayfish							X	
Short-Tailed Albatross	X	X	X	X				
Smith's Blue Butterfly	X	X		X				
Southern Sea Otter	X	X		X				
Southwestern Willow Flycatcher					X	X		
Steelhead (Central California Coast Run)	X	X		X				
Steelhead (Central Valley California Run)	X	X	X				X	X
Steelhead (Northern California Run)		X	X					
Steller Sea Lion (Eastern Population)	X	X	X	X				
Tidewater Goby	X	X	X	X				
Valley Elderberry Longhorn Beetle	X	X	X				X	X
Vernal Pool Fairy Shrimp	X	X	X				X	X
Warner Sucker							X	
Western Snowy Plover	X	X	X	X				

Source: CDFG 2003; University of Nevada, Reno (UNR) Biological Resources Research Center 2001; NatureServe Explorer 2003; Nevada Natural Heritage Program 2001; ODFW 1997; USFWS 2003.

Table 3.1.6-4 Federally Listed Threatened and Endangered Wildlife Species Within the Military Training Routes for the Proposed Action in California, Nevada, and Oregon

Federally Listed Threatened And Endangered Wildlife	IR-212	IR-236	VR-201	VR-208	VR-1250	VR-1252	VR-1254	SR-381
Arroyo Toad								
Bald Eagle	X	X	X	X	X	X	X	X
Brown Pelican			X		X	X	X	X
California Condor								
California Least Tern								
California Red-Legged Frog					X			
Carson Wandering Skipper					X		X	
Chinook Salmon (California Coastal Run)					X			
Coho Salmon (California and Oregon Population)					X			
Desert Tortoise	X	X						
Green Sea Turtle					X			
Guadalupe Fur Seal					X			
Inyo California Towhee		X						
Leatherback Sea Turtle					X			
Light-Footed Clapper Rail								
Loggerhead Sea Turtle					X			
Marbled Murrelet					X			
Modoc Sucker							X	
Mohave Tui Chub	X	X						
Northern Spotted Owl					X		X	
Oregon Silverspot Butterfly					X			
Owen's Pupfish		X						
Owen' Tui Chub		X						
San Joaquin Kit Fox		X						
Santa Ana Sucker								
Shasta Crayfish					X		X	
Short-Tailed Albatross					X			
Southwestern Willow Flycatcher	X	X				X		
Steller Sea Lion (Eastern Population)					X			
Tidewater Goby					X			
Unarmored Threespine Stickleback								
Western Snowy Plover					X			

Source: CDFG 2003; UNR Biological Resources Research Center 2001; NatureServe Explorer 2003; Nevada Natural Heritage Program 2001; ODFW 1997; USAF 2003; USFWS 2003.

3.1.5.4 Wetlands

Wetlands are defined as areas inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Wetlands on Travis AFB include meadows, vernal pools, and lacustrine areas. Wetlands on Travis AFB are almost exclusively emergent systems of wet meadows and vernal pools associated with depressions, streams and ditches. A few small areas of scrub/shrub wetlands are associated with Union Creek. Some 300 sites are identified as containing vernal pool vegetation, as described previously in Subchapter 3.1.6.1.

Wetland meadows are scattered throughout the Base in depressional areas, which are maintained by mowing or discing, or used as pasture for cattle and horse. Wetland meadows are usually wet throughout the rainy season (USAF 2001c).

A man-made, open-water area associated with North Gate Park Pond and was created by the impoundment of Union Creek. North Gate Park Pond is 2.2 surface acres and has an average depth of approximately 5 feet. A number of small ponds are also present in the southeast portion of the Base and exhibit an open-water environment (USAF 2001c). Wetlands on Travis AFB are shown on Figure 3.1.6-1.

3.1.6 Socioeconomic Resources

3.1.6.1 Population

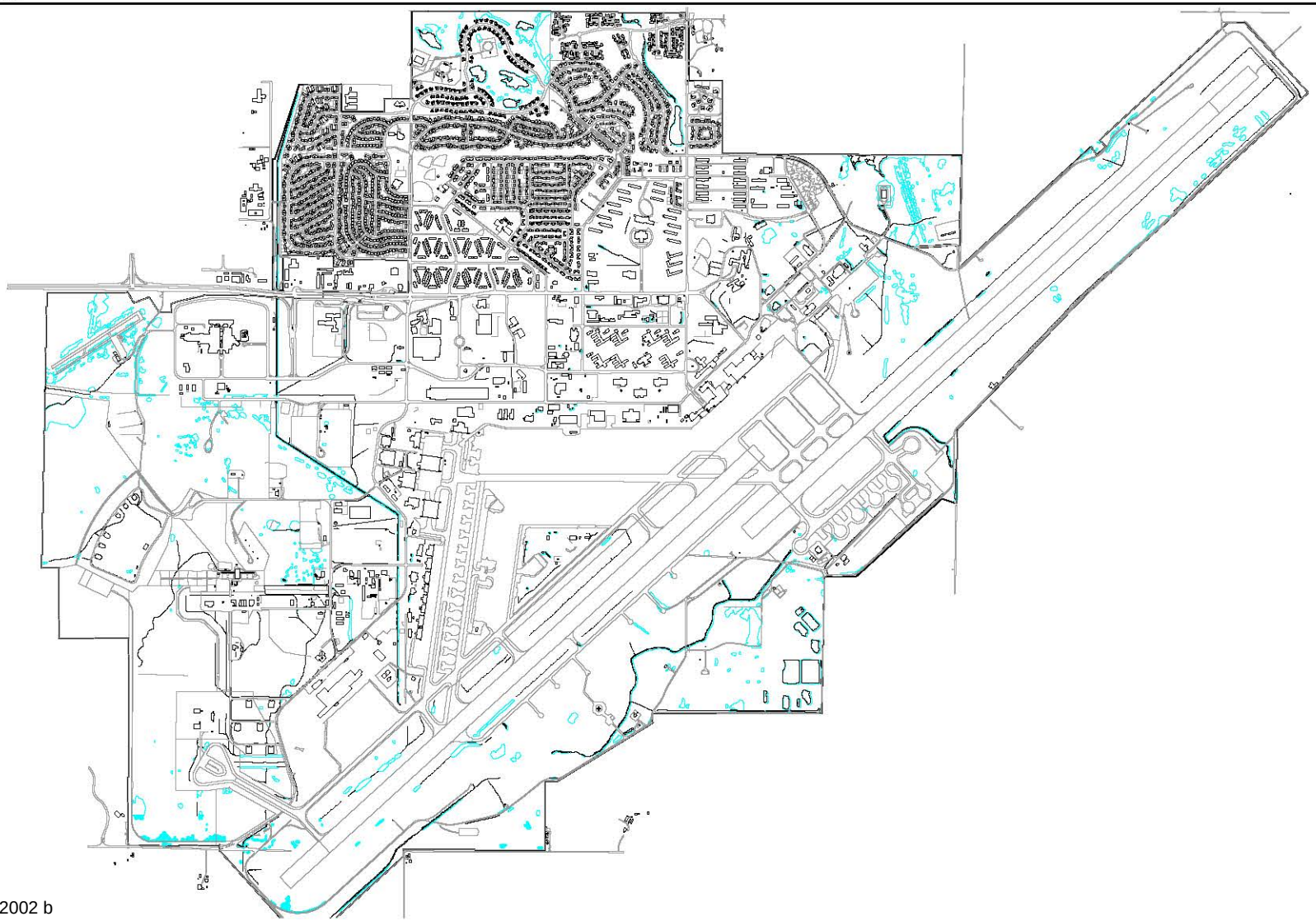
Travis AFB is located in Solano County situated within the Vallejo-Fairfield-Napa Primary Metropolitan Statistical Area (PMSA), a component of the San Francisco-Oakland-San Jose Consolidated Metropolitan Statistical Area (CMSA). Travis AFB is within the boundaries of the City of Fairfield, with other nearby major cities being Vallejo, Vacaville and Suisun City. Over 80 percent of Solano County's population is concentrated in these four cities. The on-Base population on Travis AFB is approximately 7,732 (USAF 2001f). Table 3.1.7-1 provides a comparative summary of the population trends from 1990-2000 for these geographic jurisdictions near Travis AFB.

Table 3.1.7-1 Population Trends Near Travis AFB, 1990 through 2000

Geographic Area	2010 Projected Population[1]	Percent Population Change (1990-2000)	2000 Population[2]	1990 Population[3]
Solano County	485,500	15.8	394,542	340,421
City of Vallejo	129,200[4]	6.5	116,351	109,199
City of Fairfield	112,200[4]	24.6	96,168	77,211
City of Vacaville	102,000[4]	24.0	88,644	71,479
City of Suisun City	30,300[4]	14.8	26,050	22,686
Vallejo-Fairfield-Napa PMSA	629,400[4]	15.0	518,821	451,186
San Francisco-Oakland-San Jose CMSA	8,074,600[4]	12.6	7,039,362	6,253,311

1 Source: California Department of Finance [CDOF] 2001.
2 Source: United States Department of Commerce [USDOC] 2000.
3 Source: USDOC 1990.
4 Source: Association of Bay Area Governments [ABAG] 2003.

742463 TR-WET.DWG



Source: USAF 2002 b

Travis Air Force Base

LEGEND

Wetlands

N

3,000 0 3,000

Feet

Wetlands
Travis AFB

Figure 3.1.6-1

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As reflected in Table 3.1.7-1, the population of Solano County increased by approximately 16 percent between 1990 and 2000 according to the U.S. Census Bureau. Approximately 40 percent of this increase was the result of in-migration from outside Solano County. This population growth rate is similar to the growth rate for the Vallejo-Fairfield-Napa PSMA, and greater than the growth rate for the San Francisco-Oakland-San Jose CMSA for the same time period. However, the cities of Fairfield and Vacaville in Solano County experienced much higher growth rates (24 percent) during this period. A population growth rate of 24 percent is projected for Solano County over the next 10 years (2000 to 2010) by the Demographic Research Unit of the State of California.

3.1.6.2 Housing

Table 3.1.7-2 portrays selected housing characteristics of Solano County and the largest cities within the county. According to the 2000 U.S. Census, there are 134,513 housing units in Solano County, which represents a 12 percent increase in units from 1990. Approximately 70 percent of the housing units are detached single family. Over 75 percent of the county's housing units are within the cities of Vallejo, Fairfield, and Vacaville. In the year 2000, building permits were issued for 2,346 housing units in Solano County, of which approximately 90 percent were for single-family units with an average construction value of $189,560 per unit. There are over 2,700 military family housing units on Travis AFB in addition to dormitories and temporary quarters for single personnel (USAF 2001f).

Table 3.1.7-2 Housing Characteristics, 2000

Geographic Area	Total Housing Units	Percent Owner-Occupied	Percent Vacant	Median Value (Owner-Occupied)	Median Monthly Contract Rent	Median Household Income
Solano County	134,513	65	3.0	$174,900	$712	$54,099
Vallejo	41,161	63	3.8	$162,600	$691	$50,030
Fairfield	31,867	60	2.8	$170,600	$693	$51,151
Vacaville	28,675	67	.1	$176,000	$751	$57,667
Suisun City	8,149	74	.2	$161,100	$801	$60,848
Vallejo-Fairfield-Napa PMSA	183,067	65	3.9	$187,200	$720	$53,431

Source: USDOC 2000

According to the 2000 U.S. Census, 65 percent of the housing units in Solano County are owner-occupied, with Suisun City and Fairfield having the highest and lowest owner occupancy rates respectively. Only 3 percent of the housing units were vacant in Solano County, with Vacaville and Suisun City having vacancy rates of less than 1 percent. The median value of owner occupied housing was $174,900 in Solano County in 2000, with median values ranging from $161,100 in Suisun City to $176,000 in Fairfield. Median monthly rents range from $691 in Vallejo to $801 in Suisun City, with the overall county median monthly rent being $712 according to the 2000 U.S. Census. The median household income in 2000 was $54,099 for Solano County, and ranged from $51,151 in Fairfield to $60,848 in Suisun City. All these values are within or near the range of the respective values for the Vallejo-Fairfield-Napa PMSA as reflected in Table 3.1.7-2. According to the Solano

County Multiple Listing Service (MLS) there were over 900 single-family homes for sale in December 2002, with a typical listing price well exceeding $200,000 (MLS 2002a).

3.1.6.3 Education

There are six unified school districts serving Solano County with kindergarten through 12th grade enrollment approximating 72,400. Facilities include 69 primary and elementary schools, 16 middle and junior high schools, 12 high schools and eight continuation/alternative schools. In addition, there are numerous private schools, a community college, maritime academy, and several university extension programs available. A continuation of rapid growth within Solano County is expected to result in an additional 4,000 students by the year 2007 (SCOE 2003).

The Travis Unified School District (TUSD) is one of the six unified school districts serving Solano County, and encompasses Travis AFB, portions of the Cities of Fairfield and Vacaville, and part of unincorporated Solano County. The TUSD consists of five elementary schools, a middle school, a continuation high school, and a high school. Approximately 50 percent of the students either live on the Base or are military dependents residing off-Base. The 1999-2000 total enrollment of 5,109 exceeds the optimum capacity at all the schools, reflective of the growth which has occurred within the district and surrounding area. This growth and associated demands on the schools are expected to continue with the current and planned residential developments within the district. The TUSD completed a master plan for school facilities in 1997, with a total projected need of $20.4 million between 2000 and 2005. In addition, the need for a new elementary school in the District has been identified (TUSD 2002).

3.1.6.4 Economy

Solano County had an average annual civilian labor force of 201,400 in 2001 with an unemployment rate of 4.1 percent, which was lower than the state of California unemployment rate of 5.3 percent for the same year. The Vallejo-Fairfield-Napa PMSA had an average annual civilian labor force of 267,992 and an unemployment rate of 3.9 percent in 2001. The 2001 labor force for the Vallejo-Fairfield-Napa PMSA represented a 16 percent increase over the PMSA's average annual 1995 civilian labor force of 230,770 (United States Department of Labor [USDL] 2000). Labor force data are based on place of residence and not on place of work.

Table 3.1.7-3 portrays employment by major industry sector, including the government sector, for Solano County for 1995 and 2000. Employment data by industry are based on place of work. As indicated in Table 3.1.7-3, total employment increased by almost 19,000, or 13 percent during this 5-year period with the greatest absolute increases in services and finance-insurance-real estate. Services, government and retail trade continue to be the largest sector employers comprising almost 70 percent of the total employment. Based on projections by the California Employment Development Department (CEDD), employment in the service sector is projected to grow by almost 18 percent between 2000 and 2006, with the retail trade and government sectors both projected to grow by almost 10 percent during the same period (CEDD 2002). This employment distribution and growth is characteristic of

most Bay Area counties, and generally reflective of national trends. Accompanying the area growth and development has been a commensurate increase in business activity with taxable sales of $4.7 billion in 2001 representing a 45 percent increase from 1997 for Solano County (CSBE 1997 and 2002).

Table 3.1.7-3 Total Full-and Part-Time Employment by Major Industry Sector by Place of Work, Solano County (2000 and 1995)

Industry Sector	Percent Change (1995-2000)	Percent of Total Employment (2000)	2000 Employment	Percent of Total Employment (1995)	1995 Employment
Farming	19	2	2,597	1	2,185
Agriculture, Forestry, Fishing	32	1	2,346	1	1,779
Mining	30	<1	535	<1	412
Construction	40	8	12,524	6	8,953
Manufacturing	21	7	11,066	6	9,128
Transportation, Commercial, Utilities	2	3	5,179	4	5,092
Wholesale Trade	6	3	5,108	3	4,806
Retail Trade	2	19	30,569	21	29,895
Financial, Insurance, Real Estate	40	7	10,758	5	7,699
Services	27	29	45,904	26	36,142
Government	- 5	21	33,266	25	35,089
Total	13	100	159,852	100	141,180

Source: USDOC 2001

Travis AFB is a major contributor to the local and regional economy in the form of employment and purchase of goods and supplies from the business community. Travis AFB is the largest employer in Solano County and the Vallejo-Fairfield-Napa PSMA with 14,357 military and civilian employees (USAF 2001f). It is estimated these jobs create an additional 5,489 indirect jobs in the business community. The annual payroll of $451.3 million for Travis AFB military and civilian employees generates an additional $176.4 million in wages and salaries for the above indirect jobs created. In addition, Travis AFB contributes to the economy in the form of construction and services, and purchase of materials, equipment and supplies. The total annual economic impact of Travis AFB for FY2001 was estimated at $1.08 Billion for the economic impact region (EIR), which is defined as those counties that are within a 50-mile radius of the Base (USAF 2001f).

3.1.7 Cultural Resources

Cultural resources include prehistoric and historical archaeological sites, buildings, structures, districts, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious purposes. Pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations at 36 CFR 800, federal agencies must take into consideration the potential effect of an undertaking on "historic

properties," which refers to cultural resources listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Sites not yet evaluated are considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated properties.

Numerous laws and regulations require federal agencies consider the effects of a Proposed Action on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship between other involved agencies (*e.g.*, State Offices of Historic Preservation, the Advisory Council on Historic Preservation).

Only those potential historic properties determined to be significant under cultural resource legislation are subject to protection or consideration by a federal agency. The quality of significance is considered in terms of applicability of the NRHP criteria. Significant cultural resources, either prehistoric or historic in age, are referred to as "historic properties."

Cultural resources on Air Force installations are managed in accordance with environmental laws that include: AFI 32-7065, *Cultural Resources Management*; 32 CFR 989; EO 11593 of 1971; National Historic Preservation Act of 1966, as amended; Archaeological and Historic Preservation Act (AHPA) of 1974 (PL 93-291); the Archaeological Resources Protection Act (ARPA) of 1979 (PL 96-95); the American Indian Religious Freedom Act (AIRFA) of 1978 (PL 95-341); and, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (PL 101-601). In addition, any proposed undertaking must comply with the State Historic Preservation Office (SHPO) guidelines for the States of California, Nevada and Oregon.

For this analysis, the Region of Influence (ROI) is synonymous with the Area of Potential Effect (APE), as defined by the NHPA. The ROI for the analysis of cultural resources includes:

- All areas subject to disturbance from facility construction, addition, and alteration accomplished to support the C-17 beddown at Travis AFB as defined in Subchapter 2.4.2.2. The ROI for the Proposed Action on Travis AFB is comprised solely of the built environment (*i.e.*, buildings/structures, paved parking areas, flightline, and minor landscaped areas). One hundred percent of the ROI on Travis AFB has been disturbed previously by some form of activity.
- All area on the ground within the proposed MTR corridors in California, Nevada, and Oregon that would be used for C-17 aircrew training (as shown on Figures 2.4.2-1 through 2.4.2-3). These areas include the built environment (*i.e.*, urban, suburban, rural communities) and open space (*i.e.*, undeveloped lands, national and state forests, coastal, and riverine areas).

Identification of cultural resources potentially impacted by the Proposed Action and MTRs was accomplished by reviewing the 2003 Travis AFB Integrated Cultural Resources Management Plan (ICRMP) (USAF 2003h), the National Register Information System (NRIS) (National Park Service [NPS] 2003), and SHPOs databases in California, Nevada, and

Oregon. A search of the NRIS was performed for National Register-listed archaeological sites and historic properties in California, Nevada, and Oregon by affected counties. Given the vast area covered by the individual MTRs, and the number of recorded sites on file at the respective SHPOs, only those sites listed in the NRIS database were incorporated into this study. It is assumed that additional potentially eligible sites exist in these study areas, but are not listed in the NRIS.

A total of 19 cultural resource investigations have been conducted on or near Travis AFB since 1909. Three of these cultural resources investigations have been conducted within or adjacent to the ROI on Travis AFB, as identified on Table 3.1.8-1.

Table 3.1.8-1 Previous Cultural Resources Investigations Within or Adjacent to the Travis AFB Region of Influence

Year	Study
1980	North Bay Aqueduct Alignment Evaluation
1995	Section 110 Base-Wide Cultural Resources Inventory
1996	Travis Air Force Base, California: Inventory of Cold War Properties

Source: USAF 2003h

3.1.7.1 Archaeological Resources

Archaeological resources are prehistoric or historic places where human activity has measurably altered the earth or left deposits of physical remains. Archaeological resources may include some surface deposits and below ground (subsurface) deposits. Prehistoric archaeological resources may include village sites, campsites, lithic scatters, burials, hearths (or hearth features), processing sites, caves, and rock shelters. Historical archaeological resources may include farmsteads, roads, privies, trash deposits, and/or middens.

Travis AFB

The 2003 Travis AFB ICRMP Update (USAF 2003h) identified ten archaeological sites on the Base, as shown on Table 3.1.8-2. The sites consisted of three prehistoric archaeological sites and seven historical archaeological sites. None of the seven historical archaeological sites are eligible for the NRHP, and none require further investigation. Of these seven sites, only Travis AFB-H-05, the archaeological component of a late 19th century farmstead, is located within or adjacent to the ROI at Travis AFB.

Table 3.1.8-2 Archaeological Sites on Travis AFB

Site	Description	Occupation Date	Status
CA-Sol-313	Lithic site	Unknown	Considered disturbed; destroyed for construction of DGMC.
CA-Sol-314	Lithic site	Unknown	Data recovery conducted; destroyed for construction of DGMC.
CA-CCo-252	Shell midden	Unknown	Either destroyed or located off the Base
CA-Sol-383/H	Historic road	Early 20th century	Unknown
TAFB-H-02	Farmstead	Late 19th century	Not NRHP Eligible
TAFB-H-03	Farmstead	Late 19th century	Not NRHP Eligible
TAFB-H-05	Farmstead	Late 19th century	Not NRHP Eligible
TAFB-H-11	Farmstead	Disturbed/Unknown	Not NRHP Eligible
TAFB-H-18	Farmstead	Early 20th Century	Not NRHP Eligible
Golf Course	Farmstead	Early 20th Century	Not NRHP Eligible

Source: USAF 2003h

Military Training Routes

Approximately 110 NRHP-listed archaeological sites have been identified beneath the MTR corridors in the States of California, Nevada, and Oregon. Because the area below the MTRs is vast and large areas that are remote, there is a high probability that additional sites remain unrecorded or are listed on each state's SHPO database. The recorded archaeological sites within the MTR corridors include burials, cairns, camp sites, canoe manufacturing sites, caves, dwellings, fishing camps, hearths, lithic scatters, middens, mines, mounds, oven pits and sites, petroglyphs and pictographs, rock features, rockshelters, talus pits and features, trails, and village sites. Several archaeological districts are also contained within the MTR corridors. Table 3.1.8-3 identifies the number of NRHP-listed archaeological sites by state.

Table 3.1.8-3 NRHP-Listed Archaeological Resources Sites Within or Adjacent to Military Training Routes Corridors

State	Number of Sites
California	86
Nevada	5
Oregon	19
Total	110

Source: NPS 2003

3.1.7.2 Historical Resources

For purposes of this analysis, historical resources include buildings and structures, and other physical remains of historic significance present above the ground. Historical resources date from the period of initial European contact in this area (*circa* A.D. 1770) and extend to the present. These may include houses, homesteads, farmsteads (and associated support structures or buildings), cabins, forts, schools, bridges, dams, logging sites, military facilities, structures, or buildings, and items of a similar nature.

Travis AFB

Historic buildings on Travis AFB include military housing, World War II-era structures, and Cold War Era buildings, as described herein:

- A total of 546 Wherry-Capehart housing units constructed in 1958. These structures have not been evaluated for eligibility in the NRHP.
- A total of 39 World War II-era structures. The California SHPO concurred with the determination that none of these structures have strong association with significant events or persons, are architecturally significant, or retain sufficient integrity for inclusion in the NRHP (USAF 2003h).
- A total 27 historic properties associated with the Cold War Era have been determined to be potentially eligible for inclusion in the NRHP. Potentially eligible and non-eligible Cold War Era historic buildings are identified in Table 3.1.8-4. The preliminary findings for eligibility of Cold War Era historic buildings shown on Table 3.1.8-4 are pending Air Force concurrence and further study (USAF 2003h).

Two Cold War historic resources located within or adjacent to the ROI for the Proposed Action on Travis AFB and that retain integrity have been recommended as eligible for inclusion in the NRHP as National Register districts or on individual merit. These properties are located in the AFSWP Q Area, the ADC Alert and Readiness Area, and Bldg. 810 (see Table 3.1.8-4) (USAF 2003h).

- Bldg. 1212, the Unit A Rocket Checkout/Assembly building built between 1954 and 1955, is located within the ADC Alert and Readiness Area. Bldg. 1212 is potentially eligible for listing on the NRHP and has been defined as a contributing building to the proposed ADC Readiness Area Historic District. The ADC Alert and Readiness Area is recommended as potentially eligible under Criterion C and Criteria Consideration G (as demonstrating exceptional significance for a property under 50 years in age). The proposed six-building ADC Alert and Readiness Area Historical District is an excellent example of the programmatic ADC areas built in a standardized configuration throughout the United States in the 1950s. The area is associated with the high tactical role that ADC Readiness Areas played in Air Force air defense during those years. The ADC Readiness Area at Travis AFB is a coherent cluster of buildings and structures with little exterior modification and with no site infill since 1960. The proposed historic district boundary is recommended to immediately circumscribe Bldgs. 369, 1205 and 1212 (USAF 2003h). Bldg. 1212 was recently modified.
- Bldg. 810, which has been recommended as potentially eligible for the NRHP, is an oversized steel frame and open-truss aircraft hangar that formerly housed B-36 bombers beginning in 1951. The B-36 was the first intercontinental bomber with a 10,000-mile traveling range. Bldg. 810 is one of the first double cantilever medium bomber hangars built in the U.S. and displays few exterior modifications (USAF 2003h).

Table 3.1.8-4 Cold War Era Historic Resources on Travis AFB

Bldg.	Original Use	Year Built	NRHP Status
AFSWP Q Area			
902	Base Spares Office	1951-53	P
903	Storage, C Structure	1951-53	P
904	Base Spares Warehouse #1	1951-53	P
905	Base Spares Warehouse #2	1951-53	P
906	Base Spares Warehouse	1951-53	P
908	Supply and Issue Shop	1953-54	P
909	Special Weapons Readiness Crew Facility	1956-57	P
912	Base Communications Office	1956-57	P
915	Hazardous Substances Warehouses (2)	1956-57	P
916	Emergency Electrical Power Plant	1951-53	P
930	Readiness Crew & Operations Facility	1951-53	P
931	Heavy Equipment Shop	1951-53	P
932	Surveillance and Inspection Shop	1951-53	P
933	Surveillance and Inspection Shop	1951-53	P
934	Surveillance and Inspection Shop	1951-53	P
935	Surveillance and Inspection Shop	1951-53	P
936	Surveillance and Inspection Shop	1951-53	P
937	Power Station	1951-53	P
938	Base Spares Warehouse	1958-59	P
940	Paint Shop	1959-60	P
942	Surveillance and Inspection Shop	1955-56	P
943	Surveillance and Inspection Shop	1955-56	P
944	Base Spares Warehouse	1958-59	P
956	Special Weapons Storage Igloo	1951-52	NE
958	Special Weapons Storage Igloo	1951-52	NE
966	Special Weapons Storage Igloo	1951-52	NE
968	Special Weapons Storage Igloo	1951-52	NE
976	Special Weapons Storage Igloo	1951-52	NE
978	Special Weapons Storage Igloo	1951-52	NE
1944	Radioactive Waste Burial Site	1950s	NE
1947	Radioactive Waste Burial Site		NE
ADC Alert and Readiness Area			
369	ADC Flight Simulator Training	1955	P
1205	ADC Readiness/Maintenance Hangar	1953	P
1212	Unit A, Rocket Checkout/Assembly	1954-55	P
366	Liquid Fuel Pump Station	1953	NE
1202	Alert Hangar	1952-54	NE
1772	Liquid Fuel Storage Tank	ca. 1954	NE
Bldg 810			
810	Double-cantilever, B-36 Bomber Hangar	1952	P

Source: USAF 2003h
P Potentially Eligible
NE Not Eligible

Military Training Routes

Approximately 1,279 NRHP-listed historic properties have been identified beneath the MTR corridors for the Proposed Action. Structures identified include houses; homesteads and farmsteads (along with associated barns, corrals, and fences); cabins;, historic forts and camps; churches; schools; hotels; motels; other commercial *(i.e.*, office) buildings; creameries; granaries; tramways;, bridges; dams; sawmills; wooden water pipes; logging sites; and rock ovens. Table 3.1.8-5 identifies the number of NRHP-listed historic properties within the Proposed Action MTR corridors by state.

Table 3.1.8-5 NRHP-Listed Historic Properties Within the Military Training Routes Corridors of the Proposed Action

State	Number of Sites
California	1,007
Nevada	108
Oregon	164
Total	1,279

Source: NPS 2003

3.1.7.3 Native American Interests

Native American resources can include, but are not limited to, archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. NRHP-eligible traditional sites are subject to the same regulations, and afforded the same protection, as other types of historic properties. The ROI for Native American traditional resources associated with project activities includes extensive areas throughout California, Nevada, and Oregon.

Early and effective participation of Native American tribes and groups is an integral component to the successful completion of the Section 106 process. As lead federal agency, the Air Force initiated consultation with federally-recognized Native American tribes that may be affected by the Proposed Action, pursuant to 36 CFR 800.2 (see Appendix C).

Travis AFB

The California Native American Heritage Commission has identified two Native American groups that may be present within or near Travis AFB: the Cortina Band of Indians and the Wintun Environmental Protection Agency. As part of the preparation of the Integrated CRMP for Travis AFB, the Air Force contacted both groups in July 2002 to request background information regarding prehistoric, historic, and ethnographic land use, as well as information regarding contemporary Native American values or concerns on Travis AFB. No responses have been received by the Base (USAF 2003h). There is no evidence that any Native American burial grounds or sacred areas are located on Travis AFB that would be subject to the provisions of AIRFA or NAGPRA (USAF 2003h). To ensure that any sites of traditional cultural value are identified and adequately considered under the Proposed Action, the Air Force sent correspondence to the tribes announcing the action and requesting concerns regarding the Proposed Action (see Appendix C).

Military Training Routes

Native American groups that may be present within the ROI of the proposed MTRs in California, Nevada, and Oregon were identified based on publications by the U.S. Department of the Interior (USDOI), Bureau of Indian Affairs (USDOI 2002 and 2003). Table 3.1.8-6 lists the federally recognized Native American groups identified within the ROI for the MTRs of the Proposed Action. To ensure that any sites of traditional cultural value are identified and adequately considered under the Proposed Action, the Air Force sent correspondence to the tribes announcing the action and requesting concerns regarding the Proposed Action (see Appendix C).

3.1.8 Land Use

3.1.8.1 Travis AFB

The Travis AFB General Plan provides guidance for land use and future development on the Base. Existing land use patterns on Travis AFB have evolved over the past 50 years, based on the configuration of the two northeast-southwest runways. Facility development and supporting infrastructure have evolved over time as missions and requirements have changed or expanded. The General Plan identifies ten land use categories for the Base, dependent on the function of the activity within each facility. Aircraft operations and maintenance uses are prevalent adjacent to the runways and aircraft parking ramps. Community and administrative uses are predominantly located in the center of the Base, with accompanied housing located in the extreme northern portion of the Base. Open space persists in the western and southern Base areas. The Travis AFB General Plan provides recommendations for the expansion and redevelopment of Aircraft Operations and Maintenance land use areas should mission growth or reorganization occur.

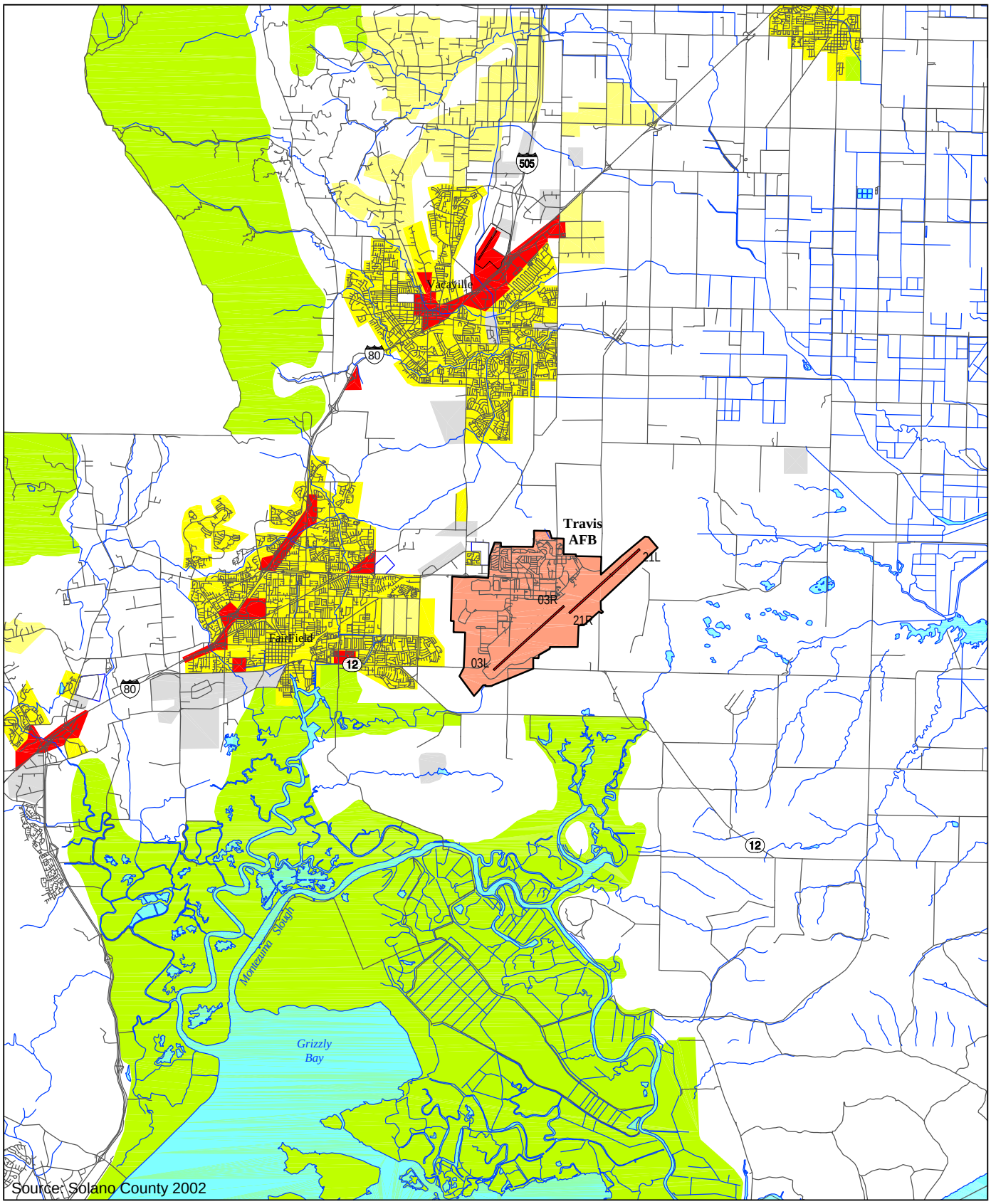
Land use in the immediate vicinity of Travis AFB (see Figure 3.1.9-1) is predominantly agricultural with interspersed rural residences, except to the west, where urban development is directly adjacent to the Base. North of Air Base Parkway in the City of Fairfield, there are areas of residential, industrial, commercial, and public uses extending from Cannon Drive to Peabody Road. To the north of the city limits and east of Peabody Road, similar uses occur in unincorporated Solano County. To the west of Peabody Road, industrial development is occurring within the City of Fairfield, with major urbanized portions of the City of Fairfield extending to a point approximately a half mile west of the Base. Residential development in Suisun City is located near the southwest corner of the Base along Walters Road, but is separated from the Base by safety clearance zone easements where no residential development is allowed. The Suisun City Lambrecht Sports Complex and Public Works Yard are located at the southwest corner of the Base.

Table 3.1.8-6 Federally Recognized Native American Groups Located Within the Region of Influence for Proposed Military Training Routes

State	Tribal Name	State	Tribal Name
California	Alturas Rancheria	California	Pit River Tribal Council
	Big Pine Reservation		Potter Valley Rancheria
	Big Sandy Rancheria of Mono Indians		Redding Rancheria
	Big Valley Rancheria		Redwood Valley Rancheria
	Blue Lake Rancheria		Round Valley Reservation
	Bridgeport Indian Colony		Rumsey Rancheria
	Cloverdale Rancheria of Pomo Indians		Santa Rosa Rancheria
	Cortina Band of Indians		Scotts Valley Rancheria
	Dry Creek Rancheria		Shingle Springs Rancheria
	Elem Indian Colony		Trinidad Rancheria
	Elk Valley Rancheria		United Auburn Indian Community
	Enterprise Rancheria		Yurok Tribe
	Fort Independence Reservation		Lytton Rancheria
	Hoopa Valley Tribal Council		Manchester Point Arena Rancheria
	Ione Band of Miwok Indians		Mechoopda Indian Tribe of the Chico Rancheria
	Jackson Rancheria		Middletown Rancheria
	Karuk Tribe of California		Mooretown Rancheria
	Lytton Rancheria		North Fork Rancheria
	Manchester Point Arena Rancheria		Paskenta Band of Nomlaki Indians
	Mechoopda Indian Tribe of the Chico Rancheria		Pit River Tribal Council
	Middletown Rancheria		Potter Valley Rancheria
	Mooretown Rancheria		Redding Rancheria
	North Fork Rancheria		Redwood Valley Rancheria
	Paskenta Band of Nomlaki Indians		
Nevada	Lovelock Tribal Council	Oregon	Burns Paiute Tribe
	Pyramid Lake Paiute Tribal Council		Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
	Reno-Sparks Tribal Council		Klamath General Council
	Shoshone-Paiute Business Council		Confederated Tribes of the Umatilla Indian Reservation
	Summit Lake Paiute Council		Confederated Tribes of the Warm Springs Reservation
	Battle Mountain Band Council		
	Elko Band Council		
	Wells Indian Colony Band Council		
	Walker River Paiute Tribal Council		
	Yerington Paiute Tribe		
	Yomba Tribal Council		

Source: USDOI 2002 and 2003

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Travis Air Force Base

LEGEND

- Air Force Installation
- Commercial
- Residential
- Rural Residential
- Industrial
- Agricultural
- Recreation/Open
- Public
- Runway
- Roadway

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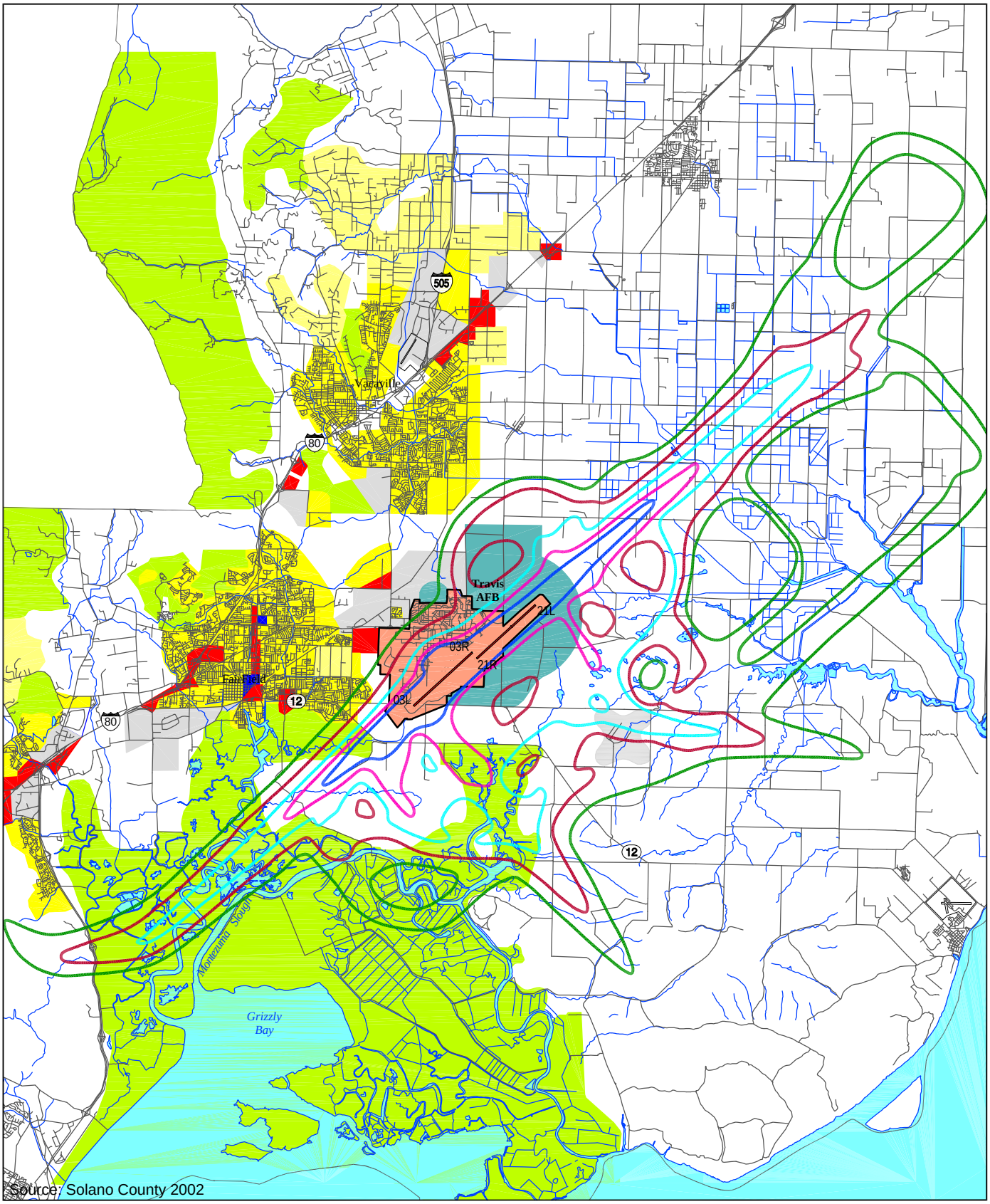
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Off-Base Land Use
Travis AFB

Figure 3.1.9-1

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Travis Air Force Base

LEGEND

- CNEL 60 dBA Contour
- CNEL 65 dBA Contour
- CNEL 70 dBA Contour
- CNEL 75 dBA Contour
- CNEL 80 dBA Contour
- Air Force Installation
- Commercial
- Residential
- Rural Residential
- Industrial
- Agricultural
- Recreation/Open
- Public
- Travis Reserve
- Runway
- Roadway

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Feet

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Local Zoning Near Travis AFB

Figure 3.1.9-2

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Land Use Plans and Zoning Regulations

The adopted Land Use Elements of the General Plans for Fairfield and Suisun City include proposed land uses within their respective city limits, and in proposed adjacent growth areas outside their city limits. These growth areas overlap the Solano County land use designations, but the Solano County designations control land use in these areas until annexed by the respective municipality.

The Travis AFB Land Use Compatibility Plan (Solano County 2002), adopted by the Solano County Airport Land Use Commission (ALUC) provides direction for future use of lands in the vicinity of the Base. Land use issues of interest to the ALUC include those involving noise and overflight compatibility, obstruction clearances, and safety of persons on the ground. Noise contours were also produced as part of the Travis AFB Land Use Compatibility Plan based on a "maximum mission" scenario which assumed a doubling of baseline aircraft operations. These contours are depicted on Figure 3.1.9-2. A determination of consistency with the Travis AFB Land Use Compatibility Plan is required of all new development proposals within the ALUC planning boundary, which includes all lands that could be negatively impacted by aircraft operations from the Base. Standards for the ALUC determination of consistency are similar to the land use compatibility standards of the Travis AFB Air Installation Compatible Use Zone (AICUZ). If the ALUC finds that a proposed development is not consistent with the Travis AFB Land Use Compatibility Plan, the responsible local agency may amend the proposal to be consistent, or it may override the ALUC determination with a two-thirds vote of its governing body.

The Solano County ALUC, adopted in 1995, provides direction for the future use of lands in the unincorporated areas of the county. There are six city-centered growth areas, one of which is the Fairfield-Suisun Urban Area. Almost all population growth will occur in and around these six urban areas. The urban growth line (see Figure 3.1.9-2) clearly defines the extent of urbanization around each city in the county and represents urban expansion within the next 15 to 20 years. The ALUC designation for areas surrounding Travis AFB on the north, east, and south is agriculture or extensive agriculture, and these areas are currently zoned for agricultural use. The land south of Highway 12 is proposed as marsh. The remaining area west of the Base (west of Peabody Road) is within the urban growth line and the proposed uses reflect the Fairfield Land Use Plan, with residential, commercial, and industrial growth.

The City of Fairfield recently adopted an updated Land Use Element as part of a comprehensive update to the city's General Plan. The update also included the Travis Protection Element. The revised plan adopts a more stringent noise standard requiring that no new or additional residential zoning be adopted within the CNEL 60 dBA noise contours. Under the 2002 revisions, a significant portion of land located east of North Gate Road, as well as land adjacent to the Base west of North Gate Road, and land southeast of the Base, has a "Travis Reserve" land use designation. Land in the Travis Reserve is set aside for future expansion of Travis AFB only as long as the military mission of the Base remains. No residential uses will be permitted in the Travis Reserve and the City of Fairfield supports its continued use for agriculture and grazing. Approximately 800 acres west of North Gate Road and north of the proposed Travis Reserve is designated for a technology park. The

unincorporated area on the east side of Peabody Road near the northwest corner of the Base between the city limits and the former Sacramento Northern Railroad is designated as a combination office commercial, community commercial, and medium- and high-density residential. Other areas west of the Base would remain predominantly non-residential with commercial, light industrial, and mixed-use light industrial/commercial. The only residential use in the vicinity of the Base would remain the area east of Peabody Road between Dobe Lane and Whitney Drive, while the public land use designation would remain for the Vanden High School and Golden West Intermediate school sites.

The Suisun City Land Use Element establishes a proposed land use pattern to the southwest of Travis AFB that is predominantly residential, extending along Walters Road from Tabor Avenue to Scandia Road. At the northern end of this area is the Peterson Ranch, approved by Suisun City for residential development, with smaller areas near the intersection of Scandia and Walters Roads designated for commercial development. The area south of Scandia Road to Highway 12 is designated as "Agriculture Open Space Reserve." All undeveloped lands south of Highway 12 are within the Suisun Marsh Protection District. The land use controls within the Suisun Marsh Protection District effectively prevent any further urban development south of Highway 12.

The AICUZ program is an on-going DoD program based on noise and safety designed to promote compatible land uses in the areas surrounding military airfields. AICUZ land use guidelines (see Table 3-1.9-1) reflect land use recommendations for clear zones (CZ), accident potential zones (APZ) I and II, and four noise zones. A CZ is the area that has the greatest potential for an accident of the three zones (*i.e.,* CZ, APZ I, and APZ II). The CZ begins at the end of the runway and the APZs extend beyond the CZ. Some obstructions may occur within the CZ if permitted under AICUZ land use guidelines, or if appropriate authorities have waived airfield planning guidance. APZ I has less accident potential than the CZ and APZ II has less potential than APZ I. These guidelines have been established on the basis of studies prepared and sponsored by several federal agencies, including the Department of Housing and Urban Development (HUD), USEPA, Air Force, and state and local agencies. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The Air Force has no desire to recommend land use regulations that render property economically useless. It does, however, have an obligation to the inhabitants of the areas surrounding Travis AFB and to the citizens of the United States to point out ways to protect the people in adjacent areas, as well as the public investment in the installation itself.

Land uses within Travis AFB's CZs are controlled by the Base through either fee simple ownership or restrictive easements. APZs I and II for both runways extend off-Base toward the northeast and southwest. A landfill is incompatibly located in the southwest APZ I due to the bird attractant BASH potential. Remaining land areas in the northeast and southwest APZs are open agricultural with no compatibility problems.

Table 3-1.9-1 Recommended Land Use

Generalized Land Use	Clear Zones and Accident Potential Zones			Noise Zones			
	CZ	APZ I	APZ II	65-69 dBA	70-74 dBA	75-79 dBA	80+ dBA
Residential	No	No	Yes[1]	Not Recommended[4]	Not Recommended[4]	Not Recommended	Not Recommended
Commercial	No	No	Yes[2]	Recommended	Recommended	Recommended	Not Recommended
Industrial	No	Yes[2]	Yes[2]	Recommended	Recommended	Recommended	Recommended
Public/Quasi-Public	No	No	Yes[2]	Recommended	Not Recommended[4]	Not Recommended[4]	Not Recommended
Recreational	No	Yes[2]	Yes[2]	Recommended	Recommended	Not Recommended	Not Recommended
Open/Agriculture/Low Density	No[3]	Yes[2]	Yes[2]	Recommended	Recommended	Recommended	Recommended

1. Suggested maximum density 1 dwelling unit per acre.
2. Only limited low-density, low-intensity uses recommended.
3. Except limited agricultural uses are permitted.
4. Unless sound attenuation materials are installed.

Source: Adapted from USAF 1999i.

3.1.8.2 Military Training Routes

The land use areas affected by proposed operations on the MTRs consist of those lands within the route corridors. The area potentially affected by the low-level routes involves primarily rural regions of California, Nevada, and Oregon. Broad areas of open space and public lands are present, as are scattered population centers, including a few larger towns and cities. A review of existing land uses that underlie the MTRs identified the following generalized land uses: urban/populated areas, industrial, recreational areas, agricultural, commercial, and transportation corridors. The vast majority of land under the MTRs is undeveloped.

Land uses associated with urban/populated centers underlying these routes include residential, commercial, industrial, and institutional (*e.g.*, schools, hospitals). Table 3.1.9-2 lists the baseline low-level routes and the urban/populated centers associated with each route. The population data provided in Table 3.1.9-2 was obtained from the 2000 U.S. Census.

Table 3.1.9-2 Urban/Populated Lands Under Proposed Action Military Training Routes

MTR	Urban/Populated Area/Population[a,b]
IR-203	Morro Bay/10,350; King City/11,094; Greenfield/12,583; Soledad/22,634; Gonzales/7,525; Salinas/143,776; Marina/21,014; Watsonville/44,265; Newman/7,093; Ceres/34,609; Modesto/188,856; Riverbank/15,826; Escalon/5,963; Orange Cove/7,722; Woodlake/6,651; Lemoncove/24,918
IR-207/208	Carmel-by-the-Sea/4,081;
VR-202	Orland/6,281
SR-300/301	Williams/3,670
SR-311/359	Plymouth/980
VR-1250	Dunsmuir/1,923
SR-381	Yerington/2,250

Population figure source: U.S. Bureau of the Census, April 2000. Urban/populated areas listed are those shown on the National Atlas of the United States and the United States Geological Survey, with a population listed in the 2000 Census of Population and Housing.

Sensitive land uses are areas of environmental importance and concern, or areas reserved for specific public activities (*e.g*., recreation, camping). There are three national parks, several national forests, recreation areas, wildlife refuges, and wilderness areas within the project area, as well as numerous state parks and recreation areas. Table 3.1.9-3 describes the significant recreational lands beneath the low-level routes by route segment.

Table 3.1.9-3 Recreational Lands Under Proposed Action Military Training Routes

Recreational Area/Location	MTR	Major Activities
Armstrong Woods State Park	IR-207/208	Public recreation, wildlife viewing.
Black Mountain Wilderness	VR-1205	Public recreation, hunting, wildlife viewing.
Death Valley National Park,	IR-236 VR-1205 VR-1215 IR-212	Activities include wildlife viewing sightseeing, picnicking, camping, auto touring, horseback riding, biking, and swimming.
El Dorado National Forest	SR-300/301 SR-311/359 SR-381	Public recreation, hunting, wildlife viewing.
Fremont National Forest	SR-300/301	Public recreation including hang gliding, fishing, wildlife viewing.
Grass Valley Wilderness	IR-236	Public recreation, wildlife viewing.
Hart Mountain National Antelope Refuge	SR-300/301	Public recreation, wildlife viewing.
Hollow Hills Wilderness	IR-212	Public recreation, hunting, wildlife viewing.
Humboldt Wildlife Management Area	IR-207/208 SR-311/359 VR-1250 VR-1254 VR-201 VR-202	Public recreation, wildlife viewing.
Inyo Mountains Wilderness	IR-236	Public recreation, wildlife viewing.
Inyo National Forest	IR-236	Public recreation, wildlife viewing.
Kelso Dunes Wilderness	IR-212	Public recreation, wildlife viewing.
Klamath National Forest	VR-1250	Public recreation, wildlife viewing.
Lake Oroville State Recreation Area	IR-207/208	Public recreation, fishing, swimming, boating, wildlife viewing.
Lassen National Forest	VR-1250 IR-207/208	Public recreation, wildlife viewing.
Los Padres National Forest	IR-203 VR-249	Public recreation, fishing, hunting, wildlife viewing.
Manly Peak Wilderness	VR-1205	Public recreation, wildlife viewing.
Mendocino National Forest	IR-207/208 SR-300/301 VR-202	Public recreation, fishing, wildlife viewing.
Modoc National Forest	SR-300/301 VR-1254	Public recreation including hang gliding, fishing, hunting, wildlife viewing.
Mojave National Park Reserve	IR-212	Auto touring, biking, bird watching, camping, hiking, horseback riding, hunting, wildlife viewing.
Morro Bay State Park	IR-203	Public recreation, fishing, wildlife viewing.
Piper Mountain Wilderness	VR-1205	Public recreation, wildlife viewing.
Plumas National Forest	IR-207/208 VR-1250 VR-202	Public recreation, fishing, wildlife viewing.
Redwood National Park	VR-1250	Activities include auto touring, biking, bird watching, boating, camping, fishing, hiking, horseback riding, kayaking, scuba diving, snorkeling, swimming, whitewater rafting, wildlife viewing

Table 3.1.9-3 Recreational Lands Under Proposed Action Military Training Routes (…*continued*)

Recreational Area/Location	MTR	Major Activities
Rodman Mountains Wilderness	IR-212	Public recreation, hunting, wildlife viewing.
Salinas River National Wildlife Refuge	IR-203	Public recreation, fishing, hunting, wildlife viewing.
San Simeon State Park	IR-203	Public recreation, fishing wildlife viewing.
Sequoia National Forest	IR-236	Public recreation, wildlife viewing.
Shasta National Forest	SR-300/301 VR-1250	Public recreation, fishing, hunting, wildlife viewing.
Sheldon National Wildlife Refuge	SR-300/301	Public recreation, wildlife viewing.
Six Rivers National Forest	VR-1250	Public recreation, wildlife viewing.
Sonoma Coast State Beach	IR-207/208	Public recreation, fishing, surfing, wildlife viewing.
Stanislaus National Forest	SR-300/301	Public recreation, fishing, wildlife viewing.
Surprise Canyon Wilderness	VR-1205	Public recreation, wildlife viewing.
Sylvania Mountains Wilderness	VR-1205 VR-207/208	Public recreation, wildlife viewing.
Tahoe National Forest	SR-311/359	Public recreation, fishing, wildlife viewing.
Toiyabe National Forest	SR-300/301 SR-311/359 SR-381 VR-1252 VR-201 VR-208	Public recreation, fishing, wildlife viewing.
Trinity National Forest	SR-300/301	Public recreation, fishing, hunting, wildlife viewing.
Willow Creek-Lurline Wildlife Management Area	IR-207/208	No public access

3.1.9 Infrastructure and Utilities

3.1.9.1 Water Supply

The primary source of potable water at Travis AFB is through a contract with the City of Vallejo. Raw water is supplied by the North Bay Aqueduct Authority to the city-owned and operated Travis AFB Water Treatment Plant. The Plant has a treatment capacity of 6.0 million gallons per day (mgd). The source of the water for the North Bay Aqueduct is from Barker Slough, a tributary to the Sacramento River, and the amount of water that can be drawn from this source may be limited in dry years to protect the spawning habitat of the Delta smelt, a federal and state listed endangered species. The water is filtered and fluoridated at the Travis AFB Water Treatment Plant, pumped to Reservoirs 1, 2, or 4 and then chlorinated before distribution on Base. The total amount of water purchased by the Base in FY 01 was 1,047 million gallons (MG), which averages about 2.87 mgd (USAF 2002c). This is equivalent to about 200 gal/day/person.

There are four reservoirs (concrete or metal closed-top tanks) on Base. Reservoir 1 has a capacity of 700,000 gallons. Reservoir 2 has a capacity of 2 MG. Reservoir 3 has a capacity of 1 MG and Reservoir 4 has a capacity of 2.5 MG. The total capacity of the four reservoirs is 6.2 MG. Distribution to the Base is made by a 24-inch main, a 12-inch main, and a 16-inch main. An additional 600,000-gallon storage tank is located at DGMC. Four deluge tanks are located near the hangars to provide a dedicated supply for the aircraft hangar fire sprinkler systems. These deluge tanks have a combined capacity of 1.45 MG (Lovejoy 2003).

In addition to the contract water supply, the Base has a well field (three active water wells designated 2029, 2037 and 2038) located approximately 4 miles north of the Base at the Cypress Lakes Golf Course. These wells have a capacity to provide up to 3.91 mgd. The well field produced 139 MG in 2002, with most production occurring between November and April. The maximum available supply of water from these three wells is limited to approximately 3.3 mgd due to the pipe diameter size (14-inch) from the well field to Reservoir 3 on Base. The water is treated with chlorine at each of the three well heads and the water is fluoridated at the pumping station after exiting Reservoir 3. A Drinking Water Master Plan was completed in July 1998 for Travis AFB. According to the Master Plan, the overall water system for Travis AFB is adequate to meet existing needs under normal conditions (Travis GP 2002). In addition, the system is adequate for meeting the needs under any emergency conditions involving firefighting operations (Lovejoy 2003).

3.1.9.2 Waste Water Treatment

Wastewater at Travis AFB is collected by a central wastewater system at two points on the Base, (*i.e.,* the South Gate and Forbes Gate), and transferred to the Fairfield-Suisun Sewage Plant for treatment. The wastewater system consists of industrial wastewater pipes, connections to the sanitary sewer from all lavatories and showers, and janitorial sinks from all buildings and housing units. Sanitary and *de minimus* industrial wastes are discharged under permit number 019711-TAFB to the Fairfield-Suisun Sanitation District (FSSD). During FY 2001, flows from Travis AFB reached 592.1 MG per year, or an average of 1.62 mgd. This is equivalent to about 113 gal/day/person.

Due to the age of much of the sanitary sewer system and the location of portions of the system below the water table, there is a potential for groundwater to seep into the piping network of the sanitary sewer system. The Base plans to undertake a Base wide infiltration and inflow study, followed by repair of pipes experiencing infiltration of groundwater (USAF 2002c).

3.1.9.3 Storm Water Management

Travis AFB is located within the Union Creek watershed, which drains into Hill Slough and from there to Suisun Marsh, Suisun Bay, and ultimately San Francisco Bay. About 2,900 acres of upstream watershed drain into Union Creek north of the Base. Approximately 5,200 acres of additional drainage from the Base contribute to this stormwater drainage system. The main elements of the stormwater drainage system on Base include open channels, storm sewers, catch basins, and inlets. Flow from the upstream watershed is conveyed into the Base by the Main and West Branches of Union Creek. The Main Branch of Union Creek follows its historical alignment into the Duck Pond near the North Gate, and from there continues southward through the Base. The West Branch of Union Creek, constructed in about 1950, travels through the northern and western side of the Base to rejoin the Main Branch near the southwest corner of the Base. The drainage infrastructure on Base consists of six separate storm sewer systems, which each serve a drainage subbasin with both underground pipes and open channels to convey stormwater runoff to an outfall into one of the two branches of Union Creek (USAF 2002c).

Impervious areas at Travis AFB total approximately 38 percent, or about 1,976 acres. Runoff from the paved areas and parking lots enters the storm drain system, which conveys storm water away from impervious surfaces and reduces the potential for flooding. The Base's storm drain capacity is designed to handle a 10-year, 24-hour storm (USAF 2002c).

Historical flooding has ranged in severity from nuisance flooding to dangerous and damaging flood conditions. During a storm in January of 1997, flooding necessitated the evacuation of an on Base residential area and caused flooding near the active runway areas and South Gate. Other occasions of historical flooding have been associated with the difficulty of the drainage of water build up on airfield pavements, which create a hazardous environment for the Base's military mission.

A Stormwater System Drainage Improvements Plan, which included a thorough inventory of the existing systems and modeling of existing and future conditions with and without improvement projects, was completed in 2000. Recommendations included improvements varying from low to high priority. The report identified the highest priority improvements to consist of the following items: the construction of a control structure to distribute flow evenly between the two branches at the fork in Union Creek north of the Base; the replacement or restoration of inflow and outflow pipes at the Duck Pond; the construction of a new channel and expansion of an existing channel near the east end of the aircraft parking area; and the construction of a new box culvert under the active taxiway. Other high priority improvements listed were the correction of deficient pipes under the airfield pavements (USAF 2002c).

3.1.9.4 Energy

Electricity

Electrical power is supplied to the Base by two public utility companies, Pacific Gas & Electric Company (PG&E) and Western Area Power Authority. A majority of the electricity from both power companies goes to three substations, A, B, and C located on Base. Base records indicate that for FY02, the electrical consumption at the Base was 119,745,000 kilowatt hours (kWH) of electricity, of which 83,948,000 kWH was used by substations A, B, and C (Veluva 2003). There are currently 218.8 acres (9,532,064 square feet) of building space on Travis AFB (USAF 2002c). This is equivalent to 0.0344 kWH per day per square foot of building space.

Natural Gas

All natural gas for Travis is provided by PG&E. About 80 percent of the gas (pressure rating of 12 to 20 pounds) enters the Base through a pipeline located near the Front Gate, and the remainder of the gas (pressure rating of 5 pounds) enters the Base through a completely separate system near the South Gate. Both systems are considered medium pressure systems and are independent of one another. According to Base personnel, 40 percent of Base housing is serviced directly by PG&E (Lovejoy 2003). Consumption of natural gas for both the housing and commercial portions of Travis AFB was 230,150 million BTUs for 2002, which represents about 21.5 percent of the system's capacity (Veluva 2003). With

approximately 218.8 acres of building space on Base, this equates to 0.066 BTUs per day per square foot of building space.

3.1.9.5 Solid Waste Management

Management of non-hazardous solid waste generated at Travis AFB during FY 2001 totaled 45.49 tons per day, including both diverted waste and waste sent to a disposal facility. The amount of diverted waste, which includes composting, mulching, recycled, reused, donated, and concrete (construction/demolition) averaged 20.46 tons per day. Travis AFB personnel recycle an average of 1.3 tons per month of aluminum, glass, and plastics at the on Base Recycling Center and 1 ton per month at the off Base facility located outside the Main Gate (USAF 2002c).

Solid waste is collected by Solano Garbage at both the residential and commercial portions of the Base and transported to Potrero Hill Landfill. This landfill has a permit to operate through 2012 based on an annual disposal rate of 800,000 tpy (2,192 tons per day). A series of expansion cells are currently being constructed at the facility. With the expansion, the landfill will be able to receive municipal waste until 2057 based on the current disposal rates and compensation for anticipated growth of the cities of Ukiah, Sacramento, South San Francisco, Willets, and San Jose, which are serviced by the Potrero Hill Landfill (Covington 2003).

3.1.9.6 Transportation Systems

Vehicular traffic enters and exits Travis AFB through four primary gates.

1. Main Gate – located on Travis Avenue;
2. Medical Center Gate – located on Air Base Parkway and Parker Road;
3. North Gate – located on Burgan Boulevard; and
4. South Gate – located on Ragsdale Street.

The Main Gate on Travis Avenue is the Base's primary entry gate. A secondary gate, Medical Center Gate, is located off Air Base Parkway and provides direct access to the DGMC. Two additional secondary gates include the North Gate on Burgan Boulevard and the South Gate at Ragsdale Street in the extreme southwestern part of the Base. The South Gate typically accommodates all truck traffic to the Base.

The major roadways include Travis Avenue, Ragsdale Street (Cannon Drive), Burgan Boulevard, Parker Road, Hickam Avenue, and Hangar Avenue. Skymaster Drive, Broadway Street, and 1st Street serve as important collector facilities for the Base. Travis Avenue serves as the principal arterial and is oriented in an east-west direction. Ragsdale Street is the principal north-south arterial, extending from Travis Avenue in the north to the South Gate. North of Travis Avenue, Ragsdale Street extends into the residential areas as Cannon Drive. Burgan Boulevard is a key two-lane north-south arterial located on the east side of the Base. Burgan Boulevard extends north-south from the North Gate, terminating at the air passenger/cargo terminal.

Four local arterial roadways provide direct access to Travis AFB: Air Base Parkway, Peabody Road, Burgan Boulevard (off Base, this is known as North Gate Road), and Scandia Road. Air Base Parkway is the primary east-west arterial serving the Base, connecting to Interstate 80 to the west and running east to the Travis AFB Main Gate. Air Base Parkway is a four-lane divided roadway with limited access at signalized intersections for the major arterial cross-streets. Air Base Parkway carries the majority of the commuter work trips to the Base and provides access for persons destined to the DGMC. Peabody Road is a north-south arterial street that intersects Air Base Parkway approximately 1 mile west of the Main Gate. North Gate Road is a north-south roadway connecting to the North Gate of the Base. North Gate intersects with Meridian Road which extends northward to the City of Vacaville. Scandia Road is an east-west roadway that connects to the Travis AFB South Gate. Walters Road (Jepson Parkway) is a north-south arterial that serves Suisun City and eastern areas of the City of Fairfield, providing a critical north-south link between State Route 12 and Air Base Parkway.

The regional highways that serve Travis AFB include: Interstate 80, State Route 12, Interstate 680, and Interstate 505. Interstate 80 is a regional highway that serves the corridor between San Francisco and Sacramento, California. State Route 12 is located south of the Base and primarily serves to move east-west traffic within Solano County. State Route 12 extends from State Route 29 in neighboring Napa County to the Central Valley. Interstate 680 is a north-south regional highway that connects with Interstate 80 in Cordelia, south of the Base. Interstate 680 provides regional access between the Base and areas in Contra Costa and Alameda Counties. Interstate 505 is a north-south regional highway that connects with Interstate 80 in Vacaville, north of the Base.

3.1.10 Airspace and Airfield Operations

3.1.10.1 Travis AFB

Airspace Operations

Airspace is a finite resource defined vertically, horizontally, and temporally. As such, it must be managed and used in a manner that best serves commercial, general, and military aviation needs. The FAA is responsible for overall management of airspace and has established different airspace designations to protect aircraft while operating to or from an airport, transiting enroute between airports, or operating within "special use" areas identified for defense-related purposes. Rules of flight and air traffic control procedures have been established to govern how aircraft must operate within each type of designated airspace. The federal aviation regulations apply to both civil and military aircraft operations unless the FAA grants the military service an exemption or a regulation specifically excludes military operations. All aircraft operate under either IFR or VFR.

Radar vectoring, sequencing, and separation service between participating VFR and all IFR aircraft operating within the airspace around the Base is provided by Travis AFB Radar Approach Control (RAPCON). The actual airspace allocated to RAPCON is governed by the direction of traffic flow in the primary San Francisco Bay area airports and wind direction/velocity at Travis AFB. The airspace beginning about 20 miles south of Travis AFB

is Class B airspace and contains a high volume of operations associated with arrivals and departures in the San Francisco-Oakland area. Annually, approximately 115,000 sortie aircraft operations occur within the airspace controlled by the Travis AFB RAPCON, with about 15 percent of the operations (17,250 operations or 47 per day) associated with Travis AFB.

There are seven public and private use airports within the controlled airspace associated with the Travis AFB ROI. Six low-altitude federal airways pass within 20 miles of the base. The low-altitude federal airways, defined from ground based navigation aids, are used by civilian and military air traffic extending from 1,200 feet above ground level (AGL) up to, but not including 18,000 feet MSL. Additionally, airspace surrounding Travis AFB is annotated as an alert area on navigation charts to notify pilots that a high volume of pilot training occurs at the Base.

Airfield Operations

Travis AFB has two runways, 21Left/03Right and 21Right/03Left. Each runway is about 11,000 feet long and 300 feet wide. The aero club runway is about 2 miles west of the Travis AFB runways and is dedicated to aero club aircraft. The airfield elevation is 62 feet MSL and the air traffic control tower is operational 24 hours a day, 7 days a week. Figure 3.1.3-4 shows the Travis AFB runways.

Travis AFB RAPCON provides radar service to aircraft arriving and departing the Base. There are seven instrument approaches available for arrivals to the airfield. Tower-controlled traffic patterns are flown on both sides of the runways at 1,000 feet AGL for rectangular patterns and 1,500 feet AGL for overhead patterns.

The majority of aircraft operations at Travis AFB are generated by based C-5, KC-10, Navy E-6, and aero club aircraft. The Travis AFB aero club airfield operations are considered with the primary airfield operations because of its proximity to the main runways. Table 3.1.11-1 presents the average daily and total annual operations at Travis AFB.

3.1.10.2 Military Training Routes

The FAA established special use airspace (SUA) to meet the needs of military aviation. MTRs, along with military operations areas (MOA) and restricted airspace, are examples of SUA.

Table 3.1.11-1 Annual and Average Daily Airfield Operations, Baseline, Travis AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
Based						
C-5	2,454	6.72	22,627	76.70	25,081	83.42
KC-10	5,439	14.90	26,450	89.66	31,889	104.56
Navy E-6	1,236	3.38	3,066	8.40	4,302	11.78
Aero Club	5,008	13.72	2,102	5.76	7,110	19.48
subtotal	14,137	39.72	54,245	181.52	68,382	219.24
Transient						
KC-135	994	2.72		1.68	1,607	4.40
C-141	1,316	3.60	613	1.44	1,842	5.04
T-38	278	0.76	526	1.40	789	2.16
C-5	306	0.84	511	0.00	306	0.84
C-9	526	1.44	0	0.00	526	1.44
KC-10	242	0.66	0	0.00	242	0.66
C-12	328	0.90	0	0.00	328	0.90
C-17	591	1.62	0	0.00	591	1.62
C-20	110	0.30	0	0.00	110	0.30
C-130	636	1.74	0	0.00	636	1.74
F-16	44	0.12	0	0.00	44	0.12
F-18	88	0.24	0	0.00	88	0.24
T-34	44	0.12	0	0.00	44	0.12
T-45	44	0.12	0	0.00	44	0.12
B-747	898	2.46	0	0.00	898	2.46
Learjet	328	0.90	0	0.00	328	0.90
SE	77	0.21	0	0.00	77	0.21
helicopter	110	0.30	0	0.00	110	0.30
Subtotal	6,960	19.05	1,650	4.52	8,610	23.57
Total	**21,097**	**57.77**	**55,895**	**185.04**	**76,992**	**242.81**

Note: Aero club operations occur on a runway dedicated to aero club aircraft about 2 miles west of the Travis AFB primary runways. SE=single engine.

Source: USAF 2000d.

Several factors reduce risks between MTRs and other airspace used by civil aviation activities. The ceiling of many MTRs is below the minimum enroute altitude established for most of the federal airways with which they intersect. Additionally, IR and VR routes are clearly designated on aeronautical charts. However, SRs are not on aeronautical charts used by civil pilots. Both military and civil pilots follow the general "see and avoid" rules of flight. MTRs may also interact with other elements of military training airspace, either transiting through MOAs, restricted areas, or intersecting and merging with other MTRs. MTRs are coordinated through the scheduling unit's operations plan to eliminate simultaneous aircraft operations on conflicting routes scheduled by the Base. Aircrews monitor radio frequencies assigned by air traffic control or as stated in the DoD Flight Information Publications for the type of route being flown (*i.e.*, IR, VR, or SR) or the specific route. These actions advise aircrews of the location of other aircraft and help reduce the potential for airspace conflicts between aircraft operating on MTRs and other aircraft.

FAA guidance places limitations on low-altitude flying for pilots. AFI 11-202, Volume 3 (*General Flight Rules*), which implements FAA guidance for Air Force operations, states aircraft cannot be flown:

- Over congested areas (*e.g.,* cities, towns, and groups of people) at an altitude of less than 1,000 feet above the highest obstacle within 2,000 feet of the aircraft; and
- Over non-congested areas at an altitude of less than 500 feet above the surface except over open water, in special use airspace, or in sparsely populated areas. Under such exceptions, aircraft must not operate closer than 500 feet to any person, vehicle, vessel, or structure.

Additionally, AFI 11-202 states that, except for SUA and MTRs, aircraft should not be flown lower than 2,000 feet above the terrain of national parks, monuments, seashores, lakeshores, recreation areas, and scenic river ways administered by the NPS, national wildlife refuges, big game refuges, game ranges, and wildlife refuges administered by the USFWS; and wilderness and primitive areas administered by the U.S. Forest Service.

FAA Handbook 7610.4 does not establish minimum altitudes for MTRs. Establishment of minimum MTR altitudes considers the above restrictions and an altitude that corresponds with the primary aircraft type for which the route is developed. Additionally, MTR operations attempt to duplicate, to the maximum extent practicable, conditions in which they would operate in a combat environment. Therefore, MTRs for highly maneuverable (fighter) aircraft that have special equipment such as terrain-following radar tend to fly lower altitudes. Larger aircraft that are less maneuverable and do not have equipment that safely allows low level flight (transport aircraft) fly MTRs at higher altitudes. Typical effective low-level training altitudes for transport aircraft (*e.g.*, C-130 and C-17) are 300 feet AGL. However, the minimum altitudes flown consider the restrictions for overflying congested areas and people.

Appendix B contains specific information such as the route entry and exit points, enroute turn points, route width, route minimum and maximum altitudes, federal airways that intersect the MTR, other MTRs that intersect the MTR, and airports within the MTR corridor for each MTR anticipated for use under the Proposed Action. Appendix B also contains maps of each MTR.

Table 3.1.3-7 lists the aircraft types and baseline number of operations for the MTRs proposed for use by C-17 aircraft under the Proposed Action. As shown in the table, aircraft types such as fighters (*e.g.*, F/A-18, F-16, F-15), trainers (*e.g.*, T-45), and transports (*e.g.*, C-130, C-141) use the routes. Monthly use ranges from less than one operation (IRs 212 and 236, VR-1252, and SR-381) to as many as 22-operations per route (SR-300/301).

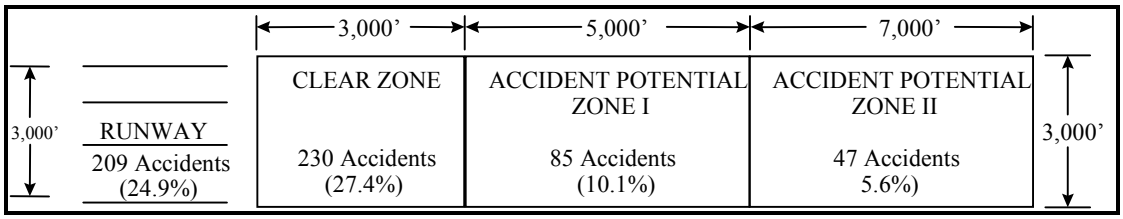
3.1.10.3 Aircraft Safety

Areas around airports are exposed to the possibility of aircraft accidents even with well-maintained aircraft and highly trained aircrews. Despite stringent maintenance requirements and countless hours of training, past history makes it clear that accidents are going to occur.

The risk of people on the ground being killed or injured by aircraft accidents is miniscule. However, an aircraft accident is a high-consequence event and, when a crash does occur, the result is often catastrophic. Because of this, the Air Force does not attempt to base its safety standards on accident probabilities. Instead it approaches this safety issue from a land-use-planning perspective through its AICUZ program. Designation of safety zones around the airfield and restriction of incompatible land uses reduces the public's exposure to safety hazards.

Subchapter 3.1.9.1 describes the CZ and APZs developed from analysis of over 800 major Air Force accidents that occurred within 10 miles of an Air Force installation between 1968 and 1995. The study found that 61 percent of the accidents were related to landing operations and 39 percent occurred during takeoff. Fighter and trainer aircraft accounted for 80 percent of the accidents, with large aircraft and helicopters accounting for the remaining 20 percent. Figure 3.1.11-1 depicts the three safety zones and summarizes the location of the accidents within a 10 nautical miles (NM) radius of the airfield.

Figure 3.1.11-1 Air Force Aircraft Accident Data (838 Accidents - 1968-1995)



Other Accidents Within 10 NMs: 267 Accidents, 32.0%

The Air Force defines five categories of aircraft flight mishaps: Classes A, B, C, E, and High Accident Potential (HAP). Class A mishaps result in loss of life, permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs ranging between $200,000 and $1 million or result in permanent partial disability, but do not involve fatalities. Class C mishaps result in more than $100,000 (but less than $200,000) in total costs, or a loss of worker productivity exceeding 8 hours. Class E mishaps represent minor incidents not meeting the criteria for Classes A through C. HAP events are significant occurrences with a high potential for causing injury, occupational illness, or damage if they occur and do not have a reportable mishap cost. Class C and E mishaps, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damages and injuries, and they rarely affect property or the public.

Class A mishaps are the most serious of aircraft-related accidents and represent the category of mishap most likely to result in a crash. Table 3.1.11-2 lists the number of class A mishaps, the lifetime class A mishap rate, the number of years for which data are maintained, and the cumulative flight hours for the C-5 and KC-10 aircraft. The table reflects the Air Force-wide data for all elements of all missions and sorties for each aircraft.

Table 3.1.11-2 C-5 and KC-10 Class A Aircraft Mishap Information

Aircraft	Class A Mishaps	Class A Mishap Rate	Years of Data	Cumulative Flight Hours
C-5	16	0.85	34	1,889,403
KC-10	7	0.77	22	911,868

Note: The mishap rate is an annual average based on the total mishaps and 100,000 flying hours. The greatest number of Class A mishaps in any one year for both aircraft is 2 mishaps.

Sources: USAF 2003a and USAF 2003b.

3.1.10.4 Bird-Aircraft Strike Hazard

Bird strikes constitute a safety concern because of the potential for damage to aircraft, injury to aircrews, or local populations if an aircraft strike and subsequent aircraft accident should occur in a populated area. Aircraft may encounter birds at altitudes of 30,000 feet MSL or higher; however, most birds fly close to the ground. Over 95 percent of reported bird strikes occur below 3,000 feet AGL. Approximately 49 percent of bird strikes occur in the airport environment, and 15 percent during low-level cruise (USAF 2003e). About 90 percent of the low-level cruise strikes occur between 300 and 5,000 feet AGL, the altitude range for most MTR operations (USAF 2003d).

AFI 91-202 (*The US Air Force Mishap Prevention Program*) requires that Air Force installations supporting a flying mission have a bird-aircraft strike hazard (BASH) plan for the base. The Travis AFB plan provides guidance for reducing the incidents of bird strikes in and around areas where flying operations are being conducted. The plan is reviewed annually and updated as needed.

Table 3.1.11-3 lists the monthly bird-aircraft strike information for 2001 within the Travis AFB airspace, as well as the monthly average for each month for the 10-year period ending December 2001. None of the bird-aircraft strikes resulted in a class A mishap. The decrease in the total annual bird strikes for the 10-year average and the annual total strikes for 2001 is attributed to implementation of additional bird control procedures.

Table 3.1.11-3 Travis AFB Bird-Aircraft Strike Information

Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
2001	9	7	11	13	13	4	0	6	5	9	6	1	84
10-Year Average	58	30	23	25	13	6	7	11	34	45	50	35	337

Source: USAF 2002c.

3.1.11 Environmental Management

3.1.11.1 Pollution Prevention

The Air Force has taken a proactive and dynamic role in developing a pollution prevention (P2) program to implement the regulatory mandates in the Pollution Prevention Act of 1990; EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements; EO 12873, Federal Acquisition, Recycling, and Waste Prevention; and EO 12902 Energy Efficiency and Water Conservation at Federal Facilities. The Air Force P2 program incorporates the following principles in priority order:

- Generation of hazardous substances, pollutants, or contaminants would be reduced or eliminated at the source whenever feasible (source reduction).
- Pollution that cannot be prevented would be recycled in an environmentally safe manner.
- Disposal, or other releases to the environment, would be employed only as a last resort and would be conducted in an environmentally safe manner, according to regulatory guidance.

AFI 32-7080 provides the directives for the Air Force P2 program. The AFI incorporates by reference applicable federal, DoD, and Air Force level regulations and directives for pollution prevention. Each installation incorporates the requirements of AFI 32-7080 into a Pollution Prevention Management Action Plan (P2 MAP). The P2 MAP is used to manage the actions needed to develop and execute an installation's P2 program. P2 MAPs are based on recurring opportunity assessments designed to continually evaluate an installation's success in achieving pollution prevention at the highest level in the hierarchy of action. The P2 MAP incorporates management strategies for meeting the goals of the program elements of the Air Force P2 program. These elements address reduction and elimination of ozone-depleting substances (ODS), USEPA 17 industrial toxics, hazardous waste, solid waste, recyclable materials, and energy conservation.

Travis AFB prepared a P2 MAP) in 2001 (USAF 2001a). The P2 MAP was prepared to effectively promote pollution prevention by minimizing or eliminating the use of hazardous materials and the release of pollution into the environment through the use of education, training and awareness programs, health-based risk assessments, acquisition practices, contract management, facilities management, energy conservation, and innovative pollution prevention technologies.

3.1.11.2 Asbestos and Lead-based Paint

Asbestos

Since the 1950s, asbestos was commonly added to a variety of building materials, including cement to enhance strength. Asbestos containing cement products generally contain Portland cement, aggregate, and asbestos fibers. Asbestos cement products have many uses, including use as pipes for water and wastewater utilities. Serious health effects

associated with exposure to airborne asbestos fibers include asbestosis, lung cancer, and mesothelioma. Although the USEPA promulgated a ban on asbestos and phase out of its use in 1989, many materials were being manufactured at that time. Therefore, without a specific cut-off date, the only way to determine the presence or absence of asbestos is through proper sampling and analysis.

Asbestos management at Air Force installations is established in AFI 32-1052, *Facility Asbestos Management*. AFI 32-1052 incorporates by reference applicable requirements of 29 CFR 669 *et seq.,* 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.140, Section 112 of the CAA, and other applicable AFIs and DoDDs. AFI 32-1052 requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the current status and condition of all asbestos-containing material (ACM) in the installation's facility inventory and documenting all asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan that details how the installation would conduct asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under the Occupational Safety and Health Act (OSHA), 29 USC §§ 669 *et seq*. Emissions of asbestos fibers to ambient air are regulated under Section 112 of the CAA.

Travis AFB prepared an Asbestos Management Strategy (USAF 2003a) that outlines the strategy for managing asbestos at Travis AFB including the responsibilities of key organizations, operational processes, management controls to prevent personnel exposure, and procedures, and specifications to capture asbestos data. Asbestos surveys at Travis AFB have been performed; however, sampling was random or project-specific, as required. Asbestos identification in buildings or structures on Travis AFB is an on-going process. The Air Force conducts asbestos inspections and surveillance for buildings that have not yet been surveyed, have been partially surveyed, or are not included in a planned renovation or demolition project (*i.e.*, comprehensive asbestos inspections are not conducted at Travis AFB). Inspections for asbestos are conducted for planned construction projects to detect, identify, locate and quantify all exposed and concealed ACM.

Buildings on Travis AFB were constructed when ACM use was common. Due the to the age of these buildings, ACM is likely to be present in all properties that have not been completely renovated. It is also possible that water lines on the Base are made of concrete containing asbestos.

Lead-based Paint

The Residential Lead-Based Paint (LBP) Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), was passed by Congress on October 28, 1992, and regulates the use and disposal of LBP at federal facilities. Federal agencies are required to comply with all applicable federal, state, interstate, and local laws relating to LBP activities and hazards.

LBP management at Air Force installations is established in the Air Force policy and guidance on LBP in facilities. The policy incorporates by reference the requirements of 29 CFR 1910.1025, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the CAA,

PL 102-550, and other applicable federal regulations. This policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards. Travis AFB prepared a Lead-Based Paint Management Plan (USAF 2003 2001d).

Lead-based paint identification in buildings or structures on Travis AFB is an on-going process. Deteriorated paint was observed in family housing units and other facilities inspected in 1994. Random sampling of paint chips collected during this study resulted in the finding that 38 percent of samples were above the HUD action level of 1.0 mg/cm^2 or 0.5 percent by weight. Since some of the buildings on Travis AFB were built before 1978, the year the DoD implemented a ban of LBP (USAF 2001d), it is possible that buildings on Travis AFB may contain LBP.

3.1.11.3 Environmental Restoration Program

The Air Force established the Installation Restoration Program (IRP) in 1983 to identify, characterize, and evaluate past disposal sites and remediate contamination on its installations as needed to control migration of contaminants and potential hazards to ecological resources, human health, and the environment in accordance with CERCLA requirements. The program has since been renamed the ERP. This program has two parts: former IRP sites that are Environmental Restoration Account (ERA)–eligible; and sites not eligible for ERA but eligible for Environmental Compliance (EC) funds.

The Travis AFB IRP Management Action Plan (MAP), describing the status of the environmental restoration and associated compliance programs, and was prepared in November 1998 (USAF 1998a). The MAP presented the comprehensive strategy for implementing response actions necessary to protect human health and the environment. The MAP provided an overview of restoration activities and strategies of the installation restoration and the environmental compliance programs for Travis AFB.

On the basis of ERP data evaluated by the USEPA, Travis AFB was placed on the NPL in 1989. In 1990, the Air Force, USEPA, California Department of Toxic Substances Control, and San Francisco Bay Regional Water Quality Control Board signed a Federal Facility Agreement to establish the framework and schedule for environmental cleanup at Travis AFB.

In 1993, the Base was divided into four Operable Units (OU) to facilitate the overall cleanup program. These units are: the West/Annexes/Basewide OU; West Industrial OU; East Industrial OU; and North OU. Sites with groundwater, soil, sediment and/or surface water contamination were identified within each OU. The ERP sites include landfills, sludge disposal areas, storm sewer systems, low level radioactive burial, a jet fuel spill area, gasoline stations, a munitions staging area, fire protection training areas, former waste disposal areas, drum storage sites, leaking underground storage tanks and other structures, waste treatment plants, and other areas. Figures 3.1.12-1 and 3.1.12-2 show the locations of sites with contaminated groundwater and soil or sediment. Sites with contaminated groundwater include areas with plumes containing chlorinated solvent, organochlorine pesticides and PCBs (USAF 2001b).

Seven of the total 33 ERP sites at Travis AFB are located beneath or within proximity of facilities that would be constructed under the Proposed Action. Routine groundwater monitoring is being conducted at some of these sites. Table 3.1.12-1 summarizes the seven contaminated sites. The Air Force developed a Long-Term Operation (LTO) Strategic Plan for the Travis AFB EC program to outline ongoing groundwater cleanup activities and monitoring strategies for soil, sediment, and surface water remediation actions on the Base (USAF 2001b).

Table 3.1.12-1 Summary of Contaminated Sites in the Area of the Proposed Action, Travis AFB

ERP Site	Name	Description	Contaminated Media	Proposed Action Site[a]
SS015	Solvent Spill Area and Facilities 808, 1832, and 552	Areas used for solvent stripping of aircraft parts, aircraft maintenance and repair, oil/water separator activities, and hazardous waste accumulation. Aircraft were chemically stripped of paint from approximately 1964 through 1980. Historical practices resulted in groundwater contamination with chlorinated VOCs that may pose a potential risk to human health. Areas of metals-contaminated soil may pose risk to ecological receptors and areas of PAH-contaminated soil may pose risk to human health. Contaminated soil will be removed.	Groundwater and soil	3
SS016	Oil Spill Area (OSA) and Facilities 11, 13/14, 20, 42/1941, and portions of storm sewer system	Flightline support areas subject to oil spills, degreasing operations, leaking oil/water separators, equipment maintenance and repair, aircraft and vehicle maintenance, hazardous materials storage, aircraft and vehicle washing, and stormwater runoff. The OSA was used from the 1940s through the 1980s. Most of the areas were used from the 1940s through present day. Historical practices resulted in groundwater contamination with chlorinated VOCs that may pose a potential risk to human health. Areas of polynuclear aromatic hydrocarbons (PAH) and PCB contaminated soil may pose potential risk to human health.	Groundwater and soil	8
SS014	Jet Fuel Spill Area (JFSA)	A petroleum-only contaminated (POCO) site, but commingled with Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) contamination. Includes portions of the jet fuel distribution system (pipes, tanks) that have released jet fuel. Currently, a thin, intermittently measured layer of floating jet fuel exists only at Site 1, within Fuel Storage Area G. Petroleum fuel hydrocarbons dissolved in the groundwater may pose a potential risk to human health.	Groundwater	10
ST018	North/South Gas Station	A POCO site, historically used as a vehicle gas station. Historical spills and leakage has resulted in groundwater contamination with petroleum fuel constituents.	Groundwater	1 and 2
SD033	Storm Sewer II, South Gate Area,	Support areas used for management of stormwater runoff, fuel transport, aircraft	Groundwater, soil, sediment	5, 6, 7 and 10

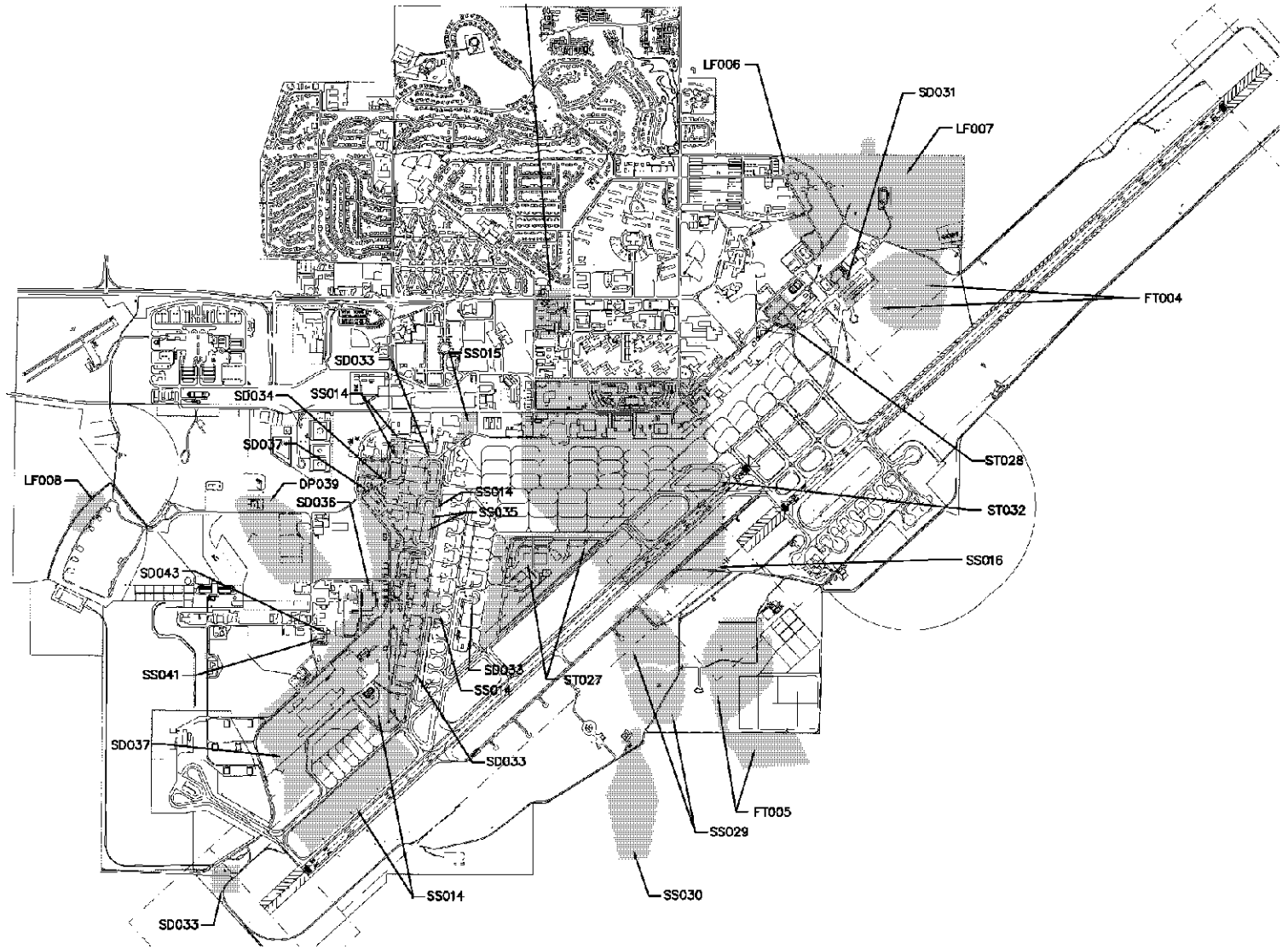
ERP Site	Name	Description	Contaminated Media	Proposed Action Site[a]
	Facilities 810 and 1917, and West Branch of Union Creek	maintenance, and aircraft washing, including the use of wash racks and oil/water separators. Facility 1917 was constructed in 1956 but is no longer in use. Facility 810 was constructed in 1955 and is currently used for aircraft maintenance. Historical practices resulted in groundwater contamination with chlorinated VOCs, some semivolatile organic compound (SVOC), and petroleum fuel hydrocarbons that may pose a potential risk to human health. Soil contamination may pose potential risk to human health. Soil and sediment contamination may also pose potential risk to ecological receptors.	and surface water	
SD036	Facilities 872/873/876	TCE release, vacuum dewatering treatability studies have been completed for source zone remediation.	Soil	4
SD037	Sanitary Sewer System, Facilities 837/838, 919, 977, 981, Ragsdale/V Street Area, and Area G Ramp	Support areas used for management of domestic and industrial wastewater, aircraft maintenance, heavy equipment maintenance, air cargo handling, vehicle washing, fuel transport, and waste accumulation. Operations began in the 1940s and continue through present day. Historical practices resulted in groundwater contamination with chlorinated VOCs, some SVOCs, and petroleum fuel hydrocarbons that may pose a potential risk to human health. Soil contaminated with petroleum fuel hydrocarbons may also pose potential risk to human health.	Groundwater and soil	9

[a] Refer to Figure 2.4.2-4 for Site Number

Source: USAF 2001b

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Travis Air Force Base

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Sites with Groundwater Contamination

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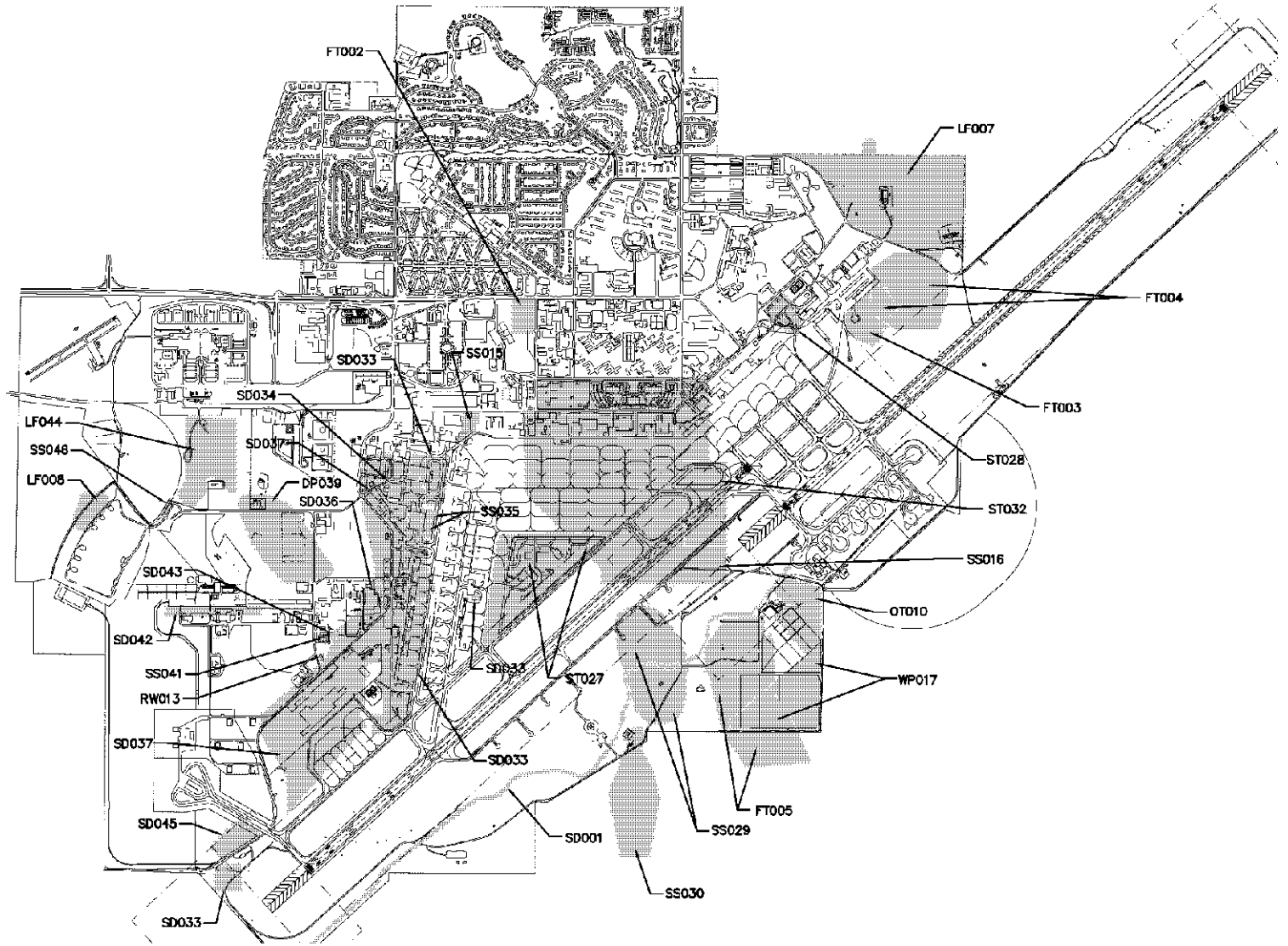
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Sites with Contaminated Groundwater on Travis AFB

Figure 3.1.12-1

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Travis Air Force Base

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Sites with Contaminated Soil or Sediment

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Sites with Contaminated Soil or Sediment at Travis AFB

Figure 3.1.12-2

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3.1.11.4 Geology

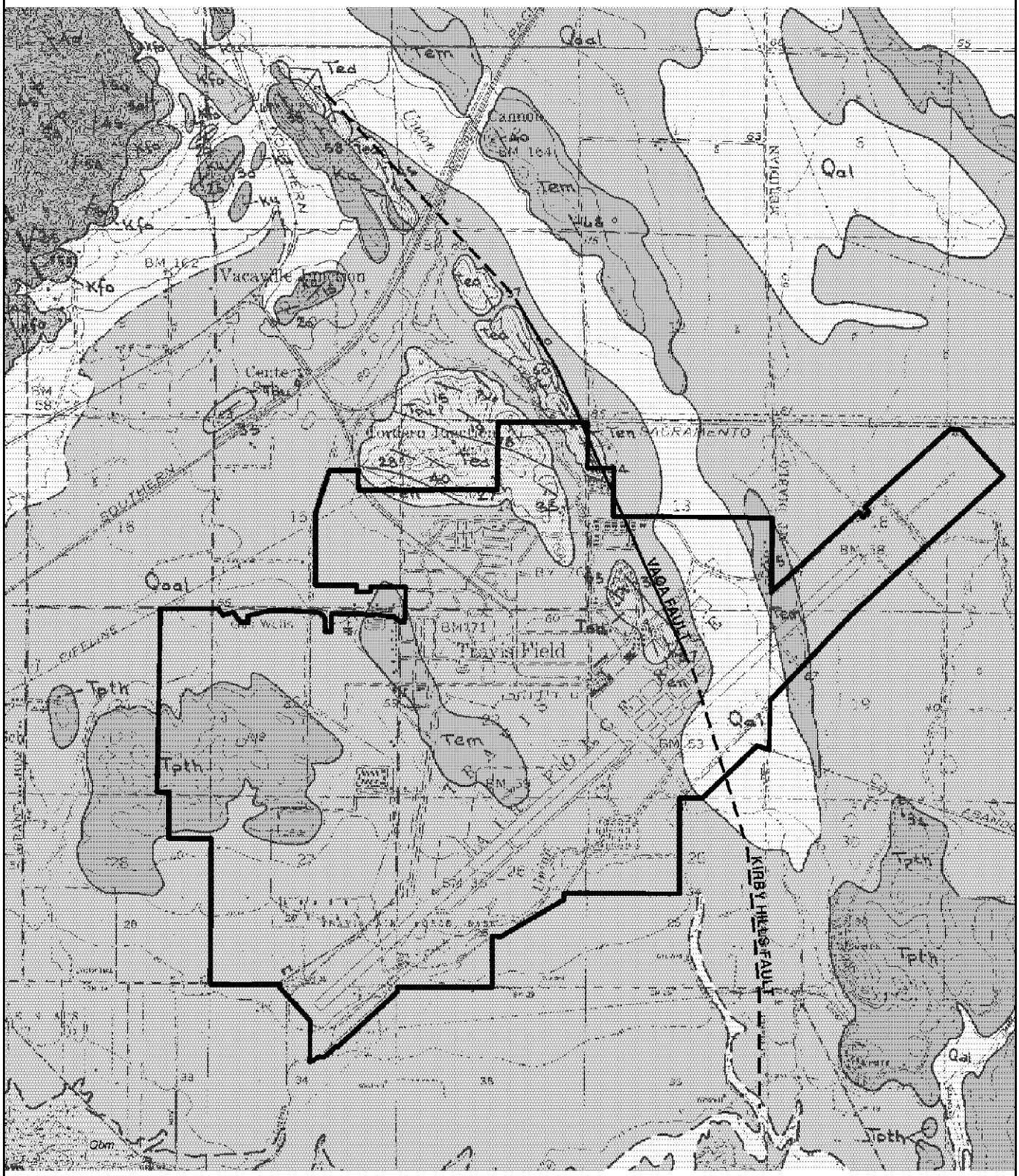
Travis AFB is situated on Quaternary bay sediments to the north of Suisun Bay. The generalized geology at the Base shows unconsolidated silty clays at the surface yielding to silts and fine sands at depths of 15-20 feet. The average water table at the Base is 10 feet bgs (USAF 2001c).

The rocks and sediments found in the area date to the Cretaceous, when a shallow marine basin receiving sediments from the east locally occupied the present Coast Ranges. Deposition of sands, silts, and clays continued with only slight interruption throughout the subsequent Paleocene and Eocene epochs. During the Pliocene, the Coast Ranges were formed, while the Cretacean, Paleocene, and Eocene marine deposits, which had become consolidated, were faulted and folded. These rocks were then subjected to erosion. Later, during Pliocene time, eroded and truncated sedimentary deposits were overlain by airborne debris from volcanic activity from the north and east. Within the Pleistocene epoch, the Coast Ranges were repeatedly faulted and folded while at the same time the ancestral Sacramento and San Joaquin Rivers eroded and carved a trough across rising ranges from the Great Central Valley to the sea. Alluvial, lagoonal, and transitional deposition continued in the Fairfield-Suisun area throughout Late Pleistocene time to the present. The San Francisco Bay, which was an ancient valley, was drowned by the rise in sea level and tectonic subsidence in Late Pleistocene (USAF 2001c).

The major portion of the Base is underlain by older alluvium of Pleistocene Age, consisting of interfingering lenses of sands, gravel, silts, and clays. The thickness of these deposits reaches up to 200 feet southwest of Fairfield. However, at Travis AFB, these deposits are quite shallow, overlying the basement rocks that are part of the outcropping evident at Potrero Hill to the south. The older alluvium constitutes the major water-bearing units in the Base vicinity to the east and west and sustains wells averaging about 200 gallons per minute (gpm) in discharge. The permeability of this unit is moderate. Underlying the alluvium, but in places cropping out at the surface through the unconsolidated sediments, are Tertiary consolidated sediments with some interbedded volca-debris; the Tehama Formation; Pleistocene-Pliocene nonmarine sediments; and the Markley Formation; Eocene marine sediments. The total thickness of these deposits reaches 7,500 feet in the Fairfield-Suisun area. In some places, the Tehama Formation yields more than 500 gpm to wells, whereas the Markley Formation generally yields little water to wells (USAF 2001c). A geologic map of Travis AFB and vicinity is provided on Figure 3.1.12-3.

The San Francisco Bay Area is an area of historic and recent seismic activity, primarily due to the presence of the San Andreas, Hayward, and Calaveras fault zones. These faults are all more than 20 miles from the Base. A smaller potentially active fault, the Green Valley fault, is about 10 miles west of the Base. The Vaca Fault System, consisting of a number of separate lineaments, has been inferred from photo lineaments, but no surface evidence has been identified in the field. This system is generally east and northeast of Travis AFB, although the Vaca fault probably traverses the Base to the east (USAF 2001c).

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Travis Air Force Base

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- Qal-Younger Alluvium
- Qbm-Bay Mud
- Qoal-Older Alluvium
- Tpth-Tehama Formation
- Ten-Markley Sandstone
- Ten-Nortonville Shale
- Ted-Domengine Sandstone
- Tpu-Unamed Formation
- Kfo-Forbes Foundation
- Kg-Guinda Formation

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Feet

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Geologic Map of Travis AFB and Vicinity

Figure 3.1.12-3

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3.1.11.5 Soils

The Travis AFB area lies along the western margin of that part of the Central Valley of California drained by the Sacramento River. The soils have weathered under a distinctive climatic cycle characteristic of the Pacific coast soil region. The organic matter that accumulates from decomposition of vegetation is largely oxidized and destroyed during late spring and summer. The oxides of iron and aluminum, rather than humus, determine the color of the surface soils. Most of the well-drained surface soils are light brown or light reddish-brown, and subsoils are dull brown or dark brown (USAF 2001c).

The soils are never frozen, although as the soils dry out in the summer, they display characteristics of frozen soils. Such soils have well-defined jointing planes, and in the soils with well-developed heavy textures and horizons, the numerous vertical joints give well-defined structural forms. Soils on Base have been considerably altered by heavy construction and by imported fill. The lower layers of most of the soils comprising Travis AFB are dense and compact. They are comparatively impervious to air and materially retard the penetration of roots or water. Consequently, there is little drainage through the soil. Soils of the Omni Series are identified as hydric (wetland) soils. However, other soil series identified on Travis AFB may contain hydric soils (USAF 2001c).

3.2 MCCHORD AFB

3.2.1 Introduction

McChord AFB is the home of the 62nd Airlift Wing, the 446th Airlift Wing (446 AW), an AFRC Reserve Associate unit, and other tenant units. The Base's primary mission is to provide for the airlift of troops, equipment, and passengers. To support National Military Strategy, the 62 and 446 AWs fly worldwide airlift missions as well as train all C-17 aircrew positions to ensure crews are current in airlift, air refueling, and airdrop procedures.

3.2.2 Air Quality

3.2.2.1 Air Pollutants and Regulations

The air pollutants and regulations discussion for Travis AFB in Subchapter 3.1.2.1 applies to McChord AFB and the Grant County Airport. The ambient air quality standards for Washington are defined in Chapter 43.21A, Department of Ecology, Revised Code of Washington. Table 3.2.2-1 lists the national and Washington ambient air quality standards.

Table 3.2.2-1 United States and Washington Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Primary NAAQS[a,b,c]	Secondary NAAQS[a,b,d]	Washington Standards[a,b]
Carbon Monoxide	8-hour 1-hour	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	No standard No standard	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)
Lead	Quarterly	1.5 μg/m^3	1.5 μg/m^3	1.5 μg/m^3
Nitrogen Dioxide	Annual	0.05 ppm (100 μg/m^3)	0.05 ppm (100 μg/m^3)	0.05 ppm (100 μg/m^3)

Criteria Pollutant	Averaging Time	Primary NAAQS[a,b,c]	Secondary NAAQS[a,b,d]	Washington Standards[a,b]
O_3	1 hour[e]	0.12 ppm (235 μg/m^3)	0.12 ppm (235 μg/m^3)	0.12 ppm (235 μg/m^3)
PM_{10}	Annual 24-hour	50 μg/m^3 150 μg/m^3	50 μg/m^3 150 μg/m^3	50 μg/m^3 150 μg/m^3
Total Suspended Particulates	Annual 24-hour	No standard No standard	No standard No standard	60 μg/m^3 150 μg/m^3
Sulfur Oxides (measured as SO_2)	Annual 24-hour 3-hour 1-hour[e] 1-hour[f]	0.03 ppm (80 μg/m^3) 0.14 ppm (365 μg/m^3) No standard No standard No standard	No standard No standard 0.50 ppm (1,300 μg/m^3) No standard No standard	0.02 ppm (55 μg/m^3) 0.10 ppm (265 μg/m^3) No standard 0.25 ppm (660 μg/m^3) 0.40 ppm (1,050 μg/m^3)

a National and Washington state standards, other than those based on an annual or quarterly arithmetic mean, are not to be exceeded more than once per year. The O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is less than or equal to one.

b The NAAQS and Washington state standards are based on standard temperature and pressure of 25°C and 760 mms of mercury, respectively. Units of measurements are ppm and (μg/m^3).

c National Primary Standards: The levels of air quality necessary to protect the public health with an adequate margin safety. Each state must attain the primary standards no later than 3 years after the SIP is approved by the USEPA.

d National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the SIP is approved by the USEPA.

e Not to be exceeded more than twice in 7 consecutive days.

f Not to be exceeded more than once per year throughout the state of Washington and never to be exceeded within the PSCAA AQCR.

3.2.2.2 Regional Air Quality

The regional air quality background information pertaining to attainment status of the NAAQS discussed in Subchapter 3.1.2.2 for Travis AFB applies to McChord AFB and the Grant County Airport. The Washington Department of Ecology has regulatory authority for air pollution control in the State of Washington. McChord AFB is located in AQCR 229. Four counties comprise AQCR 229, managed by the Puget Sound Clean Air Agency (PSCAA). According to federal regulations (40 CFR 81.348), all four counties in the PSCAA AQCR as of July 2002 are better than national standards for SO_2; unclassifiable/attainment for CO, PM_{10}, $PM_{2.5}$ and O_3; and cannot be classified as better than national standards for NO_2.

3.2.2.3 Baseline Air Emissions

McChord AFB

The CY 1998 air emissions inventory summary for PSCAA AQCR 229, which includes reported permitted stationary, mobile, and grandfathered air emission sources, is presented in Table 3.2.2-2. Table 3.2.2-3 lists the emissions calculated for the baseline C-17 aircraft operations activities at McChord AFB.

Table 3.2.2-2 Baseline Air Emissions Inventory, Puget Sound Clean Air Agency

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
AQCR 229 CY98 Totals	24,000	5,000	8,000	2,000	1,000

Note: VOCs are not an air pollutant criterion. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. Data are reflected as tpy.

Source: AIRData 2002.

T O_3able 3.2.2-3 Baseline Emissions from Aircraft Operations Activities, McChord AFB

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Airfield Operations	88.800	11.200	664.800	0.000	133.600
AGE Operation	133.620	13.876	5.032	0.056	0.360
Aircraft Trim/Power Checks	1.412	0.220	19.652	0.444	0.000
Total	223.832	25.296	689.484	0.500	133.960

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. Data are reflected as tpy.

Grant County Airport

Grant County Airport is located in Grant County within the Eastern Washington-Northern Idaho Interstate AQCR 62. The AQCR includes the Idaho Counties of Benewah, Kootenai, Latah, Nez Perce, and Shoshone, and the Washington Counties of Adams, Asotin, Columbia, Garfield, Grant, Lincoln, Spokane, and Whitman. Grant County is within the jurisdiction of the Department of Ecology Eastern Region air pollution control district (APCD). Boundaries of the Eastern Region APCD include the Washington Counties of Adams, Asotin, Columbia, Ferry, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla, and Whitman. The USEPA designated the air quality within Grant County as of July 2002 as better than national standards for SO_2; unclassified/attainment for CO and O_3; nonattainment/moderate for PM_{10}. Table 3.2.2-4 presents the emissions inventory for AQCR 62. Table 3.2.2-5 lists the emissions calculated for the baseline C-17 aircraft operations activities at Grant County Airport.

Table 3.2.2-4 Baseline Air Emissions Inventory, Eastern Washington-Northern Idaho Interstate AQCR 62

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
AQCR CY 00 Totals	29,350	**989**	**1,830**	**7,200**	3,860

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment. Data reflected as tpy.

Source: AirData 2003.

Table 3.2.2-5 Baseline Emissions from C-17 Aircraft Operations Activities, Grant County Airport

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Airfield Operations	105	18	1,507	0	256

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment. Data reflected as tpy.

Source: AirData 2003.

Military Training Routes

The MTRs proposed for use occur within Washington and Idaho. Table 3.2.2-6 lists the baseline emissions inventory, as well as the attainment status for each AQCR and Table 3.2.2-7 lists the baseline emissions from C-17 MTR operations.

Table 3.2.2-6 Baseline Air Emissions Inventory, Air Quality Control Regions Associated with Alternative Action Military Training Routes

AQCR	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)	Attainment Status
AQCR 62, WA and ID CY 99	**29,350**	898	1,830	7,200	**3,860**	Nonattainment
AQCR 63, ID CY 99	856	147	1,426	1,087	2,364	Attainment
AQCR 193, WA CY 99	48,630	3,770	29,140	92,180	4,640	Attainment
AQCR 227, WA CY 99	4,340	380	660	4,420	220	Attainment
AQCR 228, WA CY 99	38,072	3,906	10,451	18,870	2,448	Attainment
AQCR 229, WA CY 99	25,290	7,030	14,070	4,970	2,600	Attainment
AQCR 230, WA CY 99	**20,400**	1,930	3,880	3,800	**1,530**	Nonattainment

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment. Data reflected as tpy.

Source: AirData 2003.

Table 3.2.2-7 Baseline C-17 Emissions from C-17 Operations on Alternative Action Military Training Routes

AQCR/MTR	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
AQCR 62					
IR-324/325	1.90	1.11	158.34	0.00	12.18
IR-326	0.92	0.54	76.85	0.00	5.91
IR-327/328	1.03	0.60	86.11	0.00	6.63
IR-329	0.22	0.13	18.52	0.00	1.42
IR-330	0.44	0.26	37.04	0.00	2.85
IR-340	2.44	1.42	203.71	0.00	15.67

AQCR/MTR	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Total for AQCR	6.95	4.06	580.57	0.00	44.66
AQCR 63					
IR-340	1.88	1.09	156.48	0.00	12.04
AQCR 193					
VR-331	0.30	0.17	25.00	0.00	1.92
AQCR 227					
IR-324/325	0.63	0.37	52.78	0.00	4.06
IR-327/328	1.47	0.85	122.22	0.00	9.40
IR-330	0.112	0.07	10.19	0.00	0.78
Total for AQCR	2.22	1.29	185.19	0.00	14.24
AQCR 228					
VR-331	0.92	0.53	76.39	0.00	5.88
AQCR 229					
VR-331	0.13	0.08	11.11	0.00	0.85
AQCR 230					
IR-3226	0.22	0.13	18.52	0.00	1.42
IR-329	0.57	0.33	47.22	0.00	3.63
IR-340	0.58	0.34	48.15	0.00	3.70
Total for AQCR	1.37	0.80	113.89	0.00	8.75

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant. Data reflected as tpy.

3.2.3 Noise

3.2.3.1 Noise Metrics and Analysis Methodology

The sound metrics and analysis methodology discussion for Travis AFB in Subchapter 3.1.3.1 applies to McChord AFB and the Grant County Airport.

Single Event Noise Metrics

The single event sound metrics discussion for Travis AFB in Subchapter 3.1.3.1 applies to McChord AFB and the Grant County Airport. Table 3.2.3-1 provides SEL and L_{max} values for the C-17 at a distance of 1,000 feet from the aircraft.

Table 3.2.3-1 Sound Exposure Level and Maximum Sound Level for C-17 Aircraft at 1,000 Feet from the Aircraft

Aircraft Type	Sound Exposure (SEL) (dBA)	Maximum Sound Level (L_{max}) (dBA)*
C-17	99	91

Note: At nominal takeoff thrust and airspeed and at a slant distance of 1,000 feet from the aircraft.

Averaged Noise Metrics

The averaged noise metrics discussion for Travis AFB in Subchapter 3.1.3.1 applies to McChord AFB and the Grant County Airport.

Noise Analysis Methodology

The single event noise metrics discussion for Travis AFB in Subchapter 3.1.3.1 applies to McChord AFB. However, DNL is used for noise analysis purposes for McChord AFB and the Grant County Airport in this EA.

3.2.3.2 Baseline Noise Analysis, McChord AFB

The primary source of noise in the vicinity of McChord AFB is airfield operations. As indicated in Table 2.4.1-2 (No Action Alternative), 91.62 average daily airfield operations occurred at McChord AFB under the baseline condition. These operations and the resultant baseline noise environment are based on 48 C-17 aircraft at the Base. Approximately 19 percent of airfield operations occur between 10:00 p.m. and 7:00 a.m. Figure 3.2.3-1 shows the baseline condition aircraft ground tracks, and Figure 3.2.3-2 depicts the noise exposure area for the baseline. Table 3.2.3-2 lists the outdoor SEL and DNL values for the specific analysis points.

Table 3.2.3-2 Baseline SEL and DNL from Airfield Operations at Specific Analysis Points, McChord AFB

			Highest SEL by Aircraft Type (dBA							
Number	Description	DNL (dBA)	A-6	B-737	C-17	C-5	C-9	F-15	F-18	F-16
1	Tyee Park Elem. School	57	92	NA	103	87	81	91	96	86
2	Southgate Elem. School	60	100	96	103	97	94	100	100	95
3	Residential Area No. 1	61	102	97	101	99	96	102	101	87
4	Residential Area No. 2	71	111	NA	101	114	105	111	NA	106
5	Oakwood Elem. School	66	108	NA	96	109	102	107	NA	NA
6	Arlington Elem. School	64	106	NA	96	108	100	102	NA	NA
7A	Gray Middle School	62	105	NA	105	107	98	100	NA	NA
7B	Edison Elem. School	61	105	NA	95	106	98	100	NA	NA
8	Mason Middle School	55	99	92	92	99	92	95	93	NA
9	Allenmore Hospital	54	98	NA	92	98	89	93	91	NA
10	Baker Middle School	56	91	NA	95	NA	89	93	92	87
11	Sales Elem. School	54	100	NA	86	92	88	96	100	91
12A	Keithley Middle School	52	95	88	89	91	NA	95	100	90
12B	Washington High School	54	97	91	90	94	87	97	102	92
13	Brookdale Elem. School	51	89	NA	87	87	82	89	95	NA
14	Christensen Elem. School	52	100	88	92	NA	86	94	98	87
15	Elmhurst Elem. School	48	82	NA	88	NA	79	84	87	NA

			Highest SEL by Aircraft Type (dBA							
Number	Description	DNL (dBA)	A-6	B-737	C-17	C-5	C-9	F-15	F-18	F-16
16	Pacific Lutheran Univ.	51	90	NA	93	87	81	91	96	86
17	Birney Elem. School	59	93	89	99	NA	89	95	93	88
18	Fern Hill Elem. School	56	70	NA	95	NA	89	91	91	NA
19	Larchmont Elem. School	53	85	NA	93	NA	83	88	87	NA
20	St. Clair Hospital	46	90	79	77	83	84	91	89	NA
21	Carter Lake Elem. School	50	88	76	90	83	77	85	91	78
22	Heartwood Elem. School	44	81	91	83	78	72	81	87	74
23	Lakeview Elem. School	57	103	NA	100	92	88	96	101	91
24	Our Lady Church	54	90	NA	94	NA	88	88	91	NA
25	Camas Prairie Elem. School	50	NA	NA	93	NA	83	85	86	81
26	Spanaway Elem. School	53	94	NA	93	NA	87	87	93	84
27	Spanaway Jr. High School	52	90	NA	92	NA	85	87	90	NA
28	Thompson Elem. School	52	90	NA	93	NA	85	86	91	NA

Note: NOISEMAP rank orders the SEL for the 18 noisiest flight track events affecting the analysis point. Thus, NA indicates that the particular aircraft type does not produce one of the 18 noisiest events for the point. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the DNL for a point from the table to the DNL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

Source: USAF 1997

Single Event Noise Analysis, McChord AFB

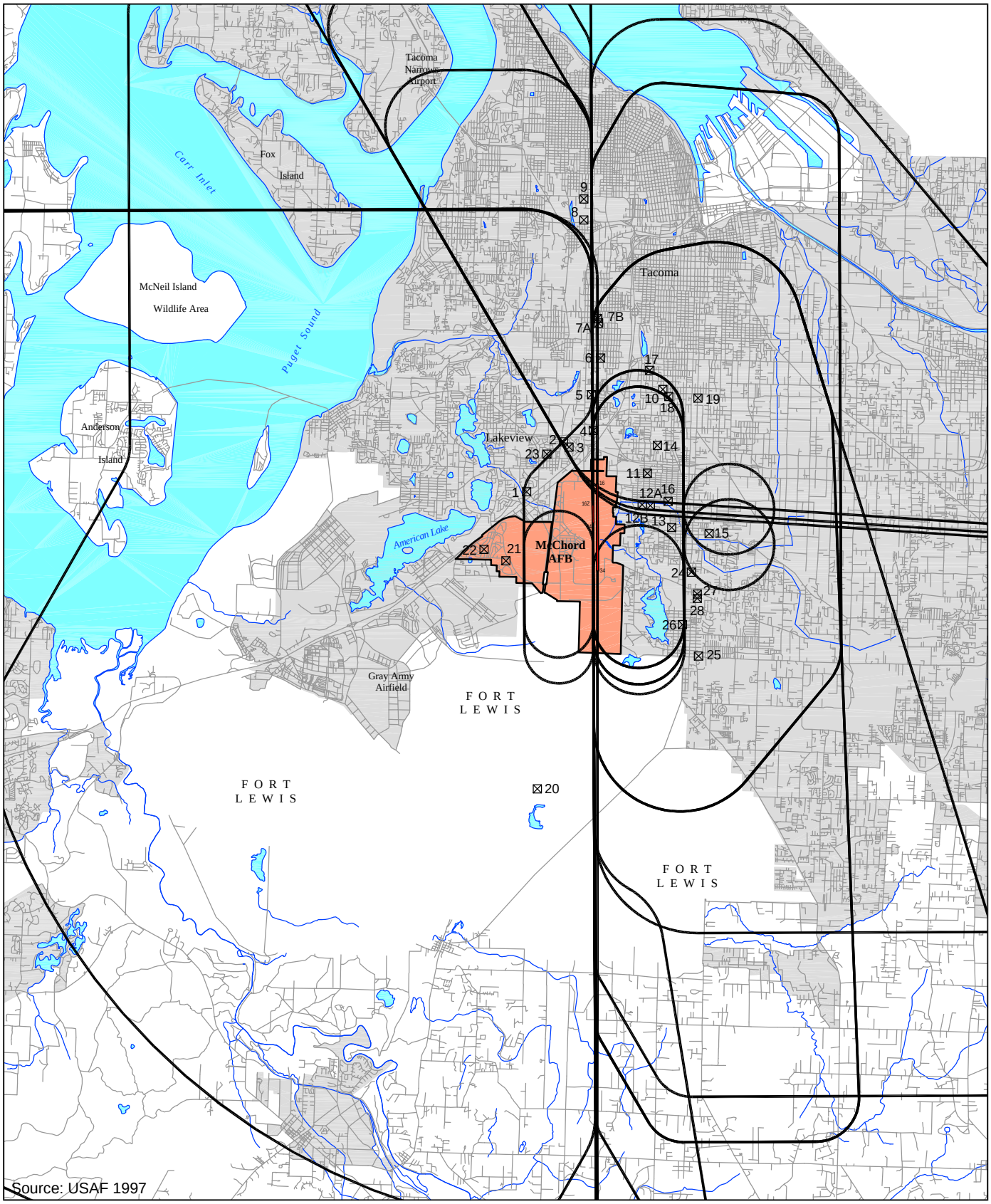
The sleep disturbance and effects of noise on structures discussion for Travis AFB in Subchapter 3.1.3.2 applies to McChord AFB. Figures 3.2.3-1 and 3.2.3-2 show the 30 specific analysis points identified for analysis in the area surrounding the airfield. These points are facilities that may be sensitive to noise from single aircraft flyover events.

Day-Night Noise Analysis, McChord AFB

Figure 3.2.3-2 shows the DNL noise contours for the baseline airfield operations condition at McChord AFB. The DNL 65 dBA contour extends about 1.75 miles north of the Base boundary, 1.0 mile south, and is about 0.6 mile wide at the widest off-Base point just north of the airfield.

The noise annoyance and percentage of persons highly annoyed by noise discussion in Subchapter 3.1.3.2 applies to McChord AFB. Table 3.2.3-3 lists the number of acres and off-base people within the DNL 65 dBA and greater noise exposure area, as well as the number of people who might be highly annoyed by noise at those levels. The numbers of people and people highly annoyed differ from the McChord C-17 Beddown EA because data from the 2000 U.S. Census are used for this study, while 1990 census data were used for the Beddown EA. The acres are based on the noise contours, which are the Proposed Action from the Beddown EA. Thus, the acres for this baseline are the same as the Beddown EA.

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McChord Air Force Base

LEGEND

- Flight Track
- Runway
- Roadway
- Analysis Point
- McChord AFB

3 0 3

Miles

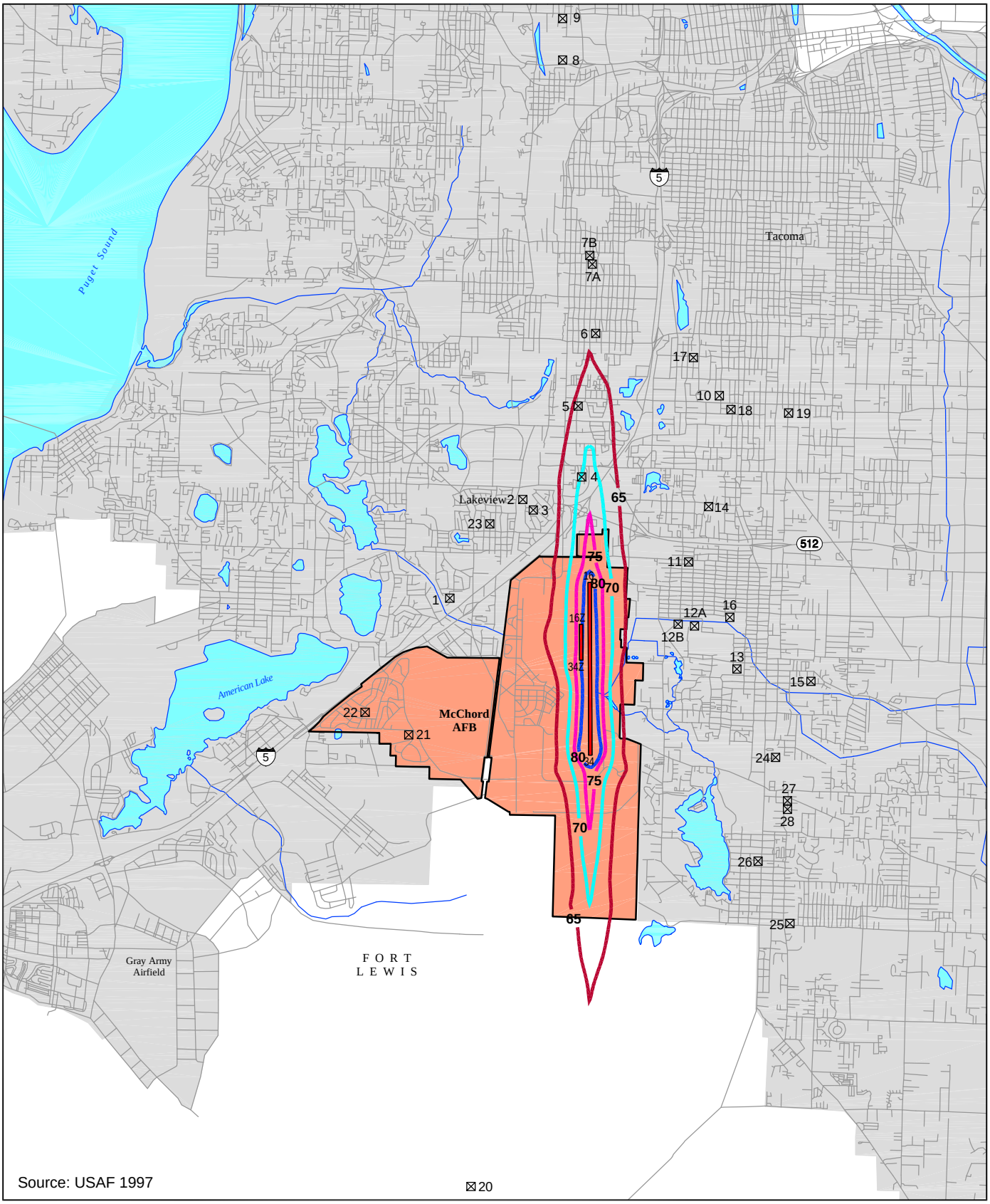
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Baseline Aircraft Ground Tracks McChord AFB

Figure 3.2.3-1

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McChord Air Force Base

LEGEND

- DNL 65 dBA Contour
- DNL 70 dBA Contour
- DNL 75 dBA Contour
- DNL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- McChord AFB

8,000 0 8,000 Feet

N

Baseline Noise Contours McChord AFB

Figure 3.2.3-2

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Table 3.2.3-3 Baseline Off-Base Noise Exposure, McChord AFB

	DNL Interval (dBA)				
Category	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres	684	148	5	0	837
People	3,434	259	0	0	3,693
People Highly Annoyed	755	96	0	0	851

3.2.3.3 Baseline Noise Analysis, Grant County Airport

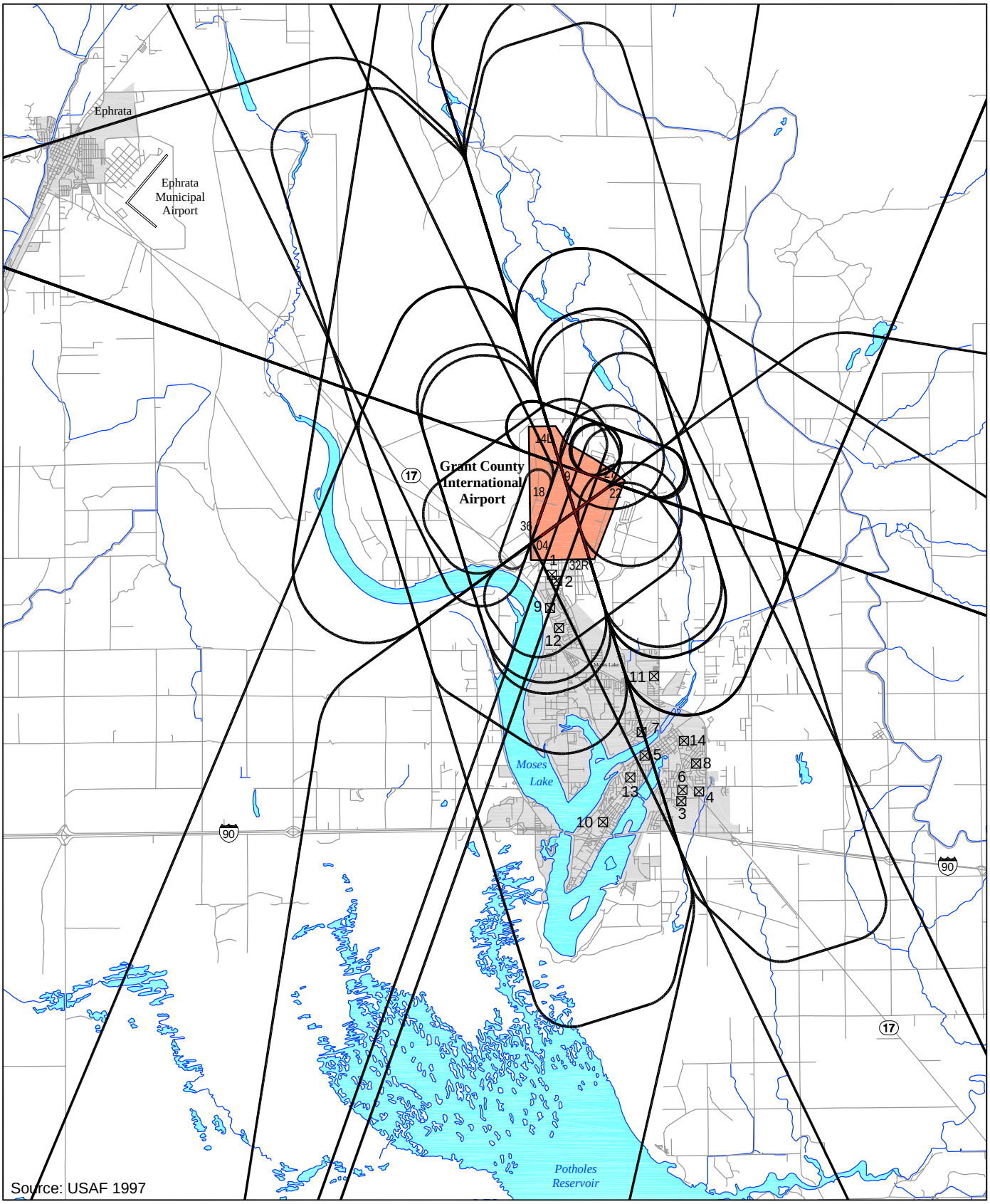
The primary source of noise in the vicinity of Grant County Airport is airfield operations. As indicated in Table 2.4.1-3 (No Action Alternative), 532.89 average daily airfield operations occurred at the airport under the baseline condition. These operations and the resultant baseline noise environment are based on McChord AFB C-17 aircraft operations at the airport, as well as other aviation activity. Approximately 3 percent of airfield operations occur between 10:00 p.m. and 7:00 a.m. Figure 3.2.3-3 shows the baseline condition aircraft ground tracks. Figure 3.2.3-4 depicts the noise exposure area for the baseline condition. Table 3.2.3-4 lists the outdoor SEL and DNL values for specific analysis points.

Table 3.2.3-4 Baseline SEL and DNL from Airfield Operations at Specific Analysis Points, Grant County Airport

			Highest SEL by Aircraft Type (dBA)			
Number	**Description**	**DNL (dBA)**	**A-6**	**B-747**	**C-141**	**C-17**
1	Big Bend Community College	53	102	NA	90	85
2	Wallenstein Performing Arts Center	53	104	NA	NA	93
3	Moses Lake High School	48	99	84	86	87
4	Chief Moses Junior High School	43	94	76	80	80
5	Frontier Junior High School	53	102	90	94	NA
6	Garden Heights Elementary School	47	98	82	84	85
7	Knolls Vista Elementary School	55	104	92	96	NA
8	Lakeview Terrace Elementary School	44	93	78	85	NA
9	North Elementary School	51	98	NA	86	95
10	Peninsula Elementary School	39	90	72	NA	66
11	Longview Elementary School	55	105	88	93	89
12	Larson Heights Elementary School	50	98	77	87	83
13	Midway Elementary School	46	97	80	82	81
14	Samaritan Hospital	48	98	83	90	NA

Note NOISEMAP rank orders the SEL for the 18 noisiest flight track events affecting the analysis point. Thus, NA indicates that the particular aircraft type does not produce one of the 18 nosiest events for the point. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the DNL for a point from the table to the DNL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

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Grant County International Airport
LEGEND

Flight Track
Runway
Roadway
Analysis Point
Grant County International Airport

3 0 3
Miles

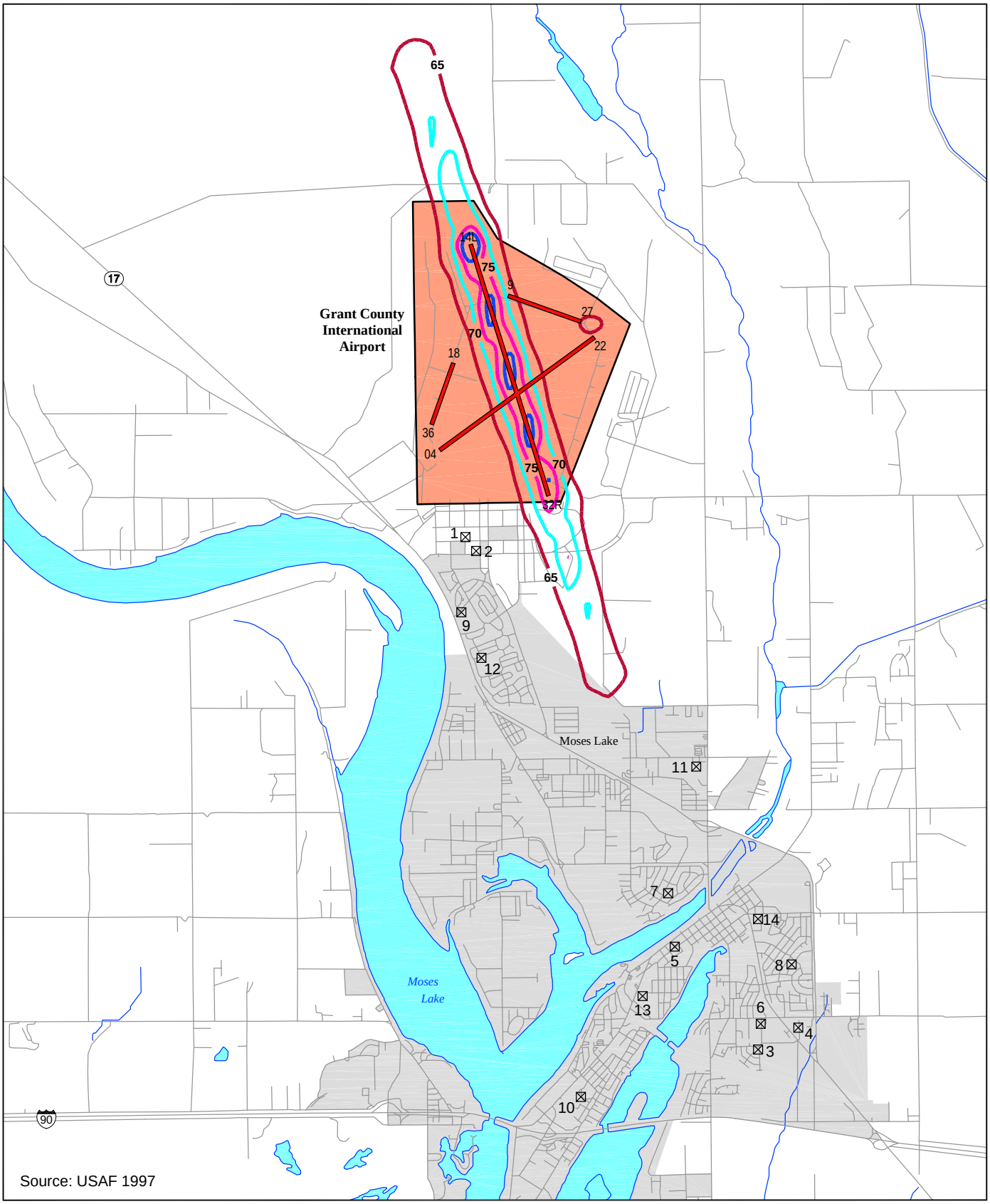
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Baseline Aircraft Ground Tracks Grant County Airport

Figure 3.2.3-3

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Grant County International Airport

LEGEND

- DNL 65 dBA Contour
- DNL 70 dBA Contour
- DNL 75 dBA Contour
- DNL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- Grant County International Airport

7,000 0 7,000
Feet

N

Baseline Noise Contours Grant County Airport

Figure 3.2.3-4

742463 ML-BLNC.DWG

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Single Event Noise Analysis, Grant County Airport

The sleep disturbance and effects of noise on structures discussion for Travis AFB in Subchapter 3.1.3.2 applies to the Grant County Airport. Figures 3.2.3-3 and 3.2.3-4 show the 14 specific analysis points identified for analysis in the area surrounding the airfield. These points are facilities that may be sensitive to noise from single aircraft flyover events.

Day-Night Noise Analysis, Grant County Airport

Figure 3.2.3-4 shows the DNL noise contours for the baseline airfield operations condition at the Grant County Airport. The DNL 65 dBA contour extends about 2.0 miles southeast of the airport boundary, 1.5 miles northwest, and is about 0.75 miles wide at the widest off-airport point just south of the airport. There also is a small area of DNL 65 dBA at the east end of Runway 09/27.

Table 3.2.3-5 lists the number of acres and off-airport people within the DNL 65 dBA and greater noise exposure area for the baseline condition, as well as the estimated number of people who might be highly annoyed by noise at those levels. These data are not presented for the Grant County Airport because there are no residential areas on the airport.

Table 3.2.3-5 Baseline Noise Exposure, Grant County Airport

	DNL Interval (dBA)				
Category	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres	1,202	503	284	62	2,051
People	15	5	2	0	22
People Highly Annoyed	3	2	1	0	6

Note: The noise annoyance and percentage of persons highly annoyed by noise discussion in Subchapter 3.1.3.2 applies to Grant County Airport. The numbers of people and people highly annoyed differ from the McChord C-17 Beddown EA because data from the 2000 U.S. Census are used for this study, while 1990 census data were used for the Beddown EA. The acres are based on the noise contours, which are the Proposed Action from the Beddown EA. Thus, the acres for this baseline are the same as the Beddown EA.

3.2.3.4 Military Training Route Noise Analysis

All nine MTRs flown by McChord AFB C-17 aircrews were environmentally assessed in the McChord C-17 Beddown EA, which analyzed sortie aircraft operations on the routes at altitudes between 300 feet AGL and 7,000 feet MSL. Table 2.4.1-4 lists the baseline C-17 MTR operations and Figure 2.4.1-1 depicts the location of the nine McChord AFB MTRs. Other aircraft types such as C-130s fly IRs 324 through 330 about two times per month for each route, while EA-6s fly IR-340 about two times per month. Refer to the McChord AFB C-17 Beddown EA for additional noise information for the nine MTRs.

As indicated in Table 3.2.3-6, the L_{dnmr} for baseline MTR operations ranges from a low of 49 dBA to a high of 59 dBA. Table 3.2.3-6 lists the SEL values for the C-17 for points directly below and lateral to the aircraft ground track. Both the L_{dnmr} and SEL (see

Table 3.2.3-7) decrease as the distance between the receptor and the route centerline increases. The L_{dnmr} is a maximum of 5 dBA greater than the values stated in Table 3.2.3-7 at the points at which the MTRs intersect or when there are common route segments. Thus, the maximum L_{dnmr} for any route is about 64 dBA.

Table 3.2.3-6 Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Alternative Action Military Training Routes, Baseline Condition

Route	L_{dnmr} (dBA)
IR-324/325	54
IR-326	49
IR-327/328	54
IR-329	49
IR-330	49
IR-340	53
VR-331	59

Note: L_{dnmr} is represented for 300 feet AGL. IR-325 is the reverse of IR-324. IR-328 is the reverse of IR-327. Thus, the operations for IRs 324 and 325 and IRs 327 and 328 are respectively combined for noise modeling purposes.

Source: USAF 1997

Table 3.2.3-7 Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Alternative Action MTRs, Baseline Condition

Aircraft	200 Feet	315 Feet	1,000 Feet	2,000 Feet	3,150 Feet
C-17	106	103	92	84	78

Source: USAF 1997

3.2.4 Hazardous Wastes, Hazardous Materials, and Stored Fuels

3.2.4.1 Hazardous Wastes

The regulatory information for hazardous wastes management for Travis AFB in Subchapter 3.1.4.1 applies to McChord AFB. The Base has a Hazardous Waste Management Plan that fulfills the requirements in Title 40, CFR Parts 260-270 and the Washington Administrative Code, Chapter 173-303, which establishes procedures to achieve and maintain regulatory compliance regarding accumulation, transportation, and disposal of hazardous waste. The plan addresses ongoing C-17 aircraft operations and maintenance activities, and is recertified each year.

McChord AFB is a large-quantity hazardous waste generator, with wastes from industrial activities primarily associated with aircraft operations and maintenance. Hazardous wastes are generated from the storage and use of POLs; however, they are normally associated with fuel spill cleanup materials, contaminated media, and/or contaminated fuel. McChord AFB stores hazardous waste for less than 90 days. McChord AFB is not required to possess or maintain a RCRA Part B Treatment, Storage or Disposal (TSD) Permit. Hazardous wastes are managed in accordance with the McChord AFB Hazardous Waste Management Plan.

3.2.4.2 Hazardous Materials

The discussion for hazardous materials regulations for Travis AFB in Subchapter 3.1.4.2 applies to McChord AFB. The management of discharges of hazardous materials is described in the Facility Response Plan for McChord AFB, as well as the HAZMAT Plan, the Base Oil and Hazardous Substance Pollution Contingency/Facility Response Spill Plan, and the HAZMAT Emergency Planning and Response Plan. McChord AFB operates a hazardous materials pharmacy for the procurement and distribution of hazardous materials.

3.2.4.3 Stored Fuels

Fuels are consumed at McChord AFB by aircraft operations (JP-8), motorized equipment operation (diesel fuel), vehicle operation (diesel fuel, gasoline, and compressed natural gas), electricity generation (diesel fuel no. 2), and heat generation (heating oil). The current JP-8 storage capacity is 3,381,882 gallons, with a planned storage capacity of 6,741,882 gallons.

Jet fuel is delivered to the Base via a contractor-operated pipeline system owned and operated by the U.S. Oil Company. McChord AFB receives jet fuel from the U.S. Oil Company pipeline twice a week at a rate of 456 gpm for a total of 504,000 gallons per week. The pipeline originates at 3001 Marshal Avenue, Tacoma, in the Port of Tacoma. Initial receiving bulk tanks are located at POL Area A, which is located on 1st Street near the intersection of A Street. A total of eight jet fuel tanks (four aboveground and four underground) are located in POL Area A, with two additional aboveground tanks planned for construction. In addition, four aboveground jet fuel tanks are located in the area to the northeast of POL Area A. The Burlington Northern Railroad bisects POL Area A in a north-south direction. Fuel is no longer downloaded from the rail line, and the previous connection has been blind flanged.

McChord AFB has a Spill Prevention Control and Countermeasures Plan (SPCCP) (USAF 1998b) that identifies the procedures, methods, equipment and other requirements to prevent the discharge of oil from non-transportation-related facilities into or upon the waters of the United States. The SPCCP includes a spill history, inspection records and requirements, training procedures, and improvement projects.

In accordance with 40 CFR 112.20, *Facility Response Plans*, the Air Force has implemented a Facility Response Plan for McChord AFB (USAF 1998c) that is used by the Base to prevent the spill and release of POL products into navigable waters. The Facility Response Plan includes facility information, emergency response information, hazard evaluations, discharge scenarios, discharge detection systems, and training requirements.

3.2.5 Water Resources

Water resources at McChord AFB encompass surface water, groundwater, floodplains, and wetlands.

3.2.5.1 Surface Water

Surface waters at McChord AFB include Morey Creek, Clover Creek, Spanaway Lake, Steilacoom Lake, Sequilitchew Creek and Sequilitchew Lake. Morey Creek originates at Spanaway Lake approximately 0.5 mile east of the Base. The creek merges with Clover Creek near the eastern border of the Base. Clover Creek enters the Base from the northeast, joins with Morey Creek, and flows through dual 12-ft diameter, 1,200 ft long culverts beneath the runway and taxiway, and flows off-Base in the western boundary where it flows toward Steilacoom Lake (USAF 2000a). Spanaway Lake and Steilacoom Lake are located away from, but relatively close to, the western perimeter boundary of McChord AFB. Water bodies are protected and managed in accordance with Air Force natural resources plans, policies and procedures.

The nearest surface waters to the proposed sites on McChord AFB are Clover Creek and a portion of Morey Creek. Most of the installation drains to Clover Creek which flows from east to west across McChord AFB. The drainage to Clover Creek is primarily through the storm drain system. Very little area along the creek sheet flows or otherwise surface flows directly to the creek (USAF 1998b).

McChord AFB has an industrial multi-sector storm water discharge permit, an installation-wide SWPPP, and requires individual permits for the management of storm water from construction projects on the Base.

3.2.5.2 Groundwater

Groundwater on McChord AFB fluctuates considerably from season to season due to the relatively high annual rainfall and the high permeability of the soil. Groundwater levels are between 10 to 20 feet bgs. A number of perched or semi-perched aquifers are associated with Clover Creek. Well depths vary from 30 to 550 feet (USAF 2000c).

Two near-surface aquifers underlie McChord AFB: the Vashon Aquifer and the Salmon Springs Aquifer. The Vashon Aquifer is approximately 0 to 70 feet thick. In some areas, the Vashon Aquifer is separated into both an upper unconfined and a lower confined aquifer. The predominant flow direction of the unconfined aquifer is to the northwest. The Salmon Springs Aquifer is located beneath the Vashon Aquifer. The Salmon Springs Aquifer is approximately 40 feet thick. Flow throughout the Salmon Springs Aquifer is primarily to the north or northwest. These two aquifers are separated by the Kitsap Aquitard. The Kitsap Aquitard, located beneath most of the Base, is laterally discontinuous. Therefore, the aquitard has only local effects on the vertical movement of groundwater (USAF 1997).

Water-bearing aquifers beneath McChord AFB are found at moderate depths. The nine active, potable water wells on the Base range in depth from 141 feet to 550 feet (USAF 1998b).

3.2.5.3 Floodplains

A floodplain survey was completed for McChord AFB by the USACE in 2000. McChord AFB has 102 acres in the 100-year floodplain, and 182 acres in the 500-year floodplain (USAF 2000c). The 100-year floodplain associated with Clover Creek west of the flightline extends to the intersection of B Street and 2nd Street. On the east side of the flightline, the 100-year floodplain associated with Morey and Clover Creeks extends to the north and south (EDR 2002a and 2002b).

3.2.6 Biological Resources

McChord AFB consists of approximately 4,600 acres contiguous with Fort Lewis (86,176 acres), near Tacoma, Washington, at the southern terminus of Puget Sound.

3.2.6.1 McChord AFB

Vegetation

The predominant land use at or near McChord AFB is urban-industrial and military infantry and air operations training, resulting from modification of Nisqually Plains gravelly prairies formed upon glacial outwashes (Johnson and O'Neil 2001). Generally described, these are grasslands interspersed with open to dense mixed coniferous-hardwood forest patches that include westside oak and dry Douglas-fir forests and woodlands (Chappell and Kagan 2001). Continual soil disturbance has permitted intrusion of exotic species, primarily Scot's broom among other invasive species that have displaced many native plants and altered natural communities.

Douglas fir at McChord AFB is a prairie race that has adapted to less than optimum soil and weather conditions. Individual trees are generally less than 125 years old and exhibit rapid initial growth followed by slow growth for trees with diameters greater than 30 inches (diameter at breast height). Slow growth indicates decreasing vigor, increased moisture stress and low soil fertility levels for older trees. These environmental factors are important as trees at McChord AFB demonstrate a higher incidence of red ring rot, a fungus that destroys the cellulose and makes the wood unusable for firewood. In addition, environmentally-stressed trees have been attacked by bark beetles in several sites since 1987. The top 15 or 20 feet of weakened trees may die back.

Firewood is the primary forest product at McChord AFB under installation natural resource management (USAF 2000c), which includes pre-commercial thinning and select tree removal, construction projects, storm damage and hazard tree reduction efforts. Firewood is sold to the McChord AFB residential community. Air Force personnel coordinate infrequent commercial harvesting operations with the Fort Lewis forest management office.

McChord AFB was formerly dominated by open grasslands containing scattered stands of oak, lodgepole pine, Ponderosa pine, and Douglas fir.

Livestock grazing under the Agricultural Outleasing program, in concert with military training has increased soil disturbance on the Base. Disturbed soils have been exploited by a variety of exotic plant species that have converted much of the natural landscape to disturbed or earlier-succession stage communities (Chappell and Kagan 2001). For example Scot's broom, a woody shrub, is particularly invasive in oak woodlands to the exclusion of native grasses. Scot's broom is the dominant shrub at McChord AFB. Germination and growth of Oregon white oak and Ponderosa pine is influenced by drought and competition with shrub species (*i.e.*, Scot's broom).

Oregon white oak, commonly called Garry oak, and Ponderosa pine communities have been identified for the installation (USAF 2000c, 2002f). Eight plant community classifications at McChord AFB are: Oregon white oak-mowed grass/forb; Oregon white oak-exotic grass/forb; Oregon white oak-serviceberry-sword fern; Oregon white oak-kinnikinnik bentgrass; Oregon white oak-snowberry-bracken fern; Oregon white oak-sedge-hook violet; Douglas-fir-Oregon white oak; and Ponderosa pine/Idaho fescue. Riparian habitats form a minor habitat component for the installation.

McChord AFB has 23 wetlands totaling 122 acres. Wetlands are protected and managed in accordance with the INRMP (USAF 2000c) and Air Force policies and procedures. Wetlands are located throughout the western and southern portions of the installation, with many seasonally-flooded palustrine wetlands formed by glacial kettles.

Wildlife

Oak and pine woodland communities support a wide diversity of wildlife species. Approximately 1,300 acres (28 percent of the installation total) provide habitat for fish or wildlife species, including over 130 birds, 19 mammals, four reptiles, six amphibians, 12 fish, 16 butterflies, and 45 moths (USAF 2000c). Snags provide roosting or rearing sites for 24 birds and five mammals that may be considered snag-obligates for management purposes. Snags are defined as dead standing timber or dead parts of living trees used by wildlife, particularly cavity-nesters such as woodpeckers and several species of squirrels. As part of the natural resource management program, the Air Force controls the retention, removal, and density of snags.

Mammals. Forest habitats are used by black-tailed deer, cottontail rabbit, black bear, coyote, Douglas squirrel, Eastern gray squirrel, raccoon, striped skunk, and opossum.

Birds. McChord AFB is located within the western migratory flyway for neotropical migratory land birds. Neotropical migrant birds are defined as any bird species nesting in the United States or Canada and wintering in the central highlands of Mexico, Central, or South America, including the Caribbean Islands. More than half of all bird species nesting in the United States are classified as neotropical migratory birds. This group is of considerable

interest for conservation efforts as about 57 percent of the bird species identified on McChord AFB are neotropical migrants (USAF 2000c; Partners in Flight 2002).

3.2.6.2 Military Training Routes

Biological resources within the MTRs associated with the Alternative Action at McChord AFB have been previously documented (USAF 1997). Vegetation and wildlife attributes and characteristics of the MTRs associated with McChord AFB, occurring in Washington and western Idaho, have been described (USAF 1997).

3.2.6.3 Threatened, Endangered, and Special Status Species

McChord AFB

A total of 27 species that may potentially occur on McChord AFB have special status as a Species of Concern by either or both the federal (USFWS) and state (Washington Department of Fish and Wildlife [WDFW]) agency. Species with a designation include eleven birds, five mammals, one reptile, two amphibians, four butterflies and four plants. Species of concern at McChord AFB are shown on Table 3.2.6-1.

Table 3.2.6-1 Species of Concern at McChord AFB

Common Name	Scientific Name	Federal Status	State Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Threatened
Peregrine falcon	*Falco peregrinus*	SOC	Sensitive
Olive-sided flycatcher	*Contopus borealis*	SOC	(None)
Loggerhead shrike	*Lanius ludovicianus*	(None)	Candidate
Merlin	*Falco columbarius*	(None)	Candidate
Northern goshawk	*Accipiter gentiles*	SOC	Candidate
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SOC	Candidate
Pileated woodpecker	*Dryocopus pileatus*	(None)	Candidate
Purple martin	*Progne subis*	(None)	Candidate
Streaked horned lark	*Eremophila alpestris strigata*	Candidate	Candidate
Vaux's swift	*Chaetura vauxi*	(None)	Candidate
Mammals			
Western gray squirrel	*Sciurus griseus*	SOC	Threatened
Western (Mazama) pocket gopher	*Thomomys mazama*	Candidate	Candidate
Townsend's big-eared bat	*Plecotus townsendii*	SOC	Candidate
Long-eared myotis (bat)	*Myotis evotis*	SOC	Monitor
Long-legged myotis (bat)	*Myotis volans*	SOC	Monitor
Reptiles			
Western pond turtle	*Clemmys marmorata*	SOC	Endangered
Amphibians			

Common Name	Scientific Name	Federal Status	State Status
Northern red-legged frog	*Rana aurora*	Candidate	(None)
Western toad	*Bufo boreas*	SOC	Candidate
Butterflies			
Puget blue	*Plebejus icaroides blackmorei*	Candidate	(None)
Valley (Zerene) silverspot	*Speyeria zerene bremnerii*	Candidate	SOC
Mardon skipper	*Polites mardon*	Candidate	Endangered
Taylor (Whulge) checkerspot	*Euphydryas editha taylori*	Candidate	Candidate
Plants			
White-top aster	*Aster curtus*	SOC	Sensitive
Water howellia	*Howellia aquatilis*	Threatened	Threatened
Torrey's peavine	*Lathyrus torreyi*	SOC	Threatened
Golden paintbrush	*Castilleja levisecta*	Endangered	Endangered

Source: USAF 2001g; WDFW 2002; USFWS 2002b.

SOC (1) An informal term that refers to those species that the USFWS believes might be in need of concentrated conservation actions. Such conservation actions vary depending on the health of the populations and degree and types of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species may need to be listed as a federal threatened or endangered species. Species of concern receive no legal protection and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species.

(2) A state Species of Concern includes those species listed as by the Washington Department of Fish and Wildlife as Endangered, Threatened, Sensitive or Candidate, as well as species listed or proposed for listing by the USFWS.

Monitor Species that are being monitored by the WDFW.

Threatened, endangered and special status species listed under the federal ESA include: one Endangered, two Threatened, and seven Candidate species. Additionally, 13 species are identified as Species of Concern by the USFWS or Washington Department of Fish and Wildlife. Suitable habitat for most listed species, including Species of Concern, does not occur on McChord AFB.

Plants. Four plants with special status are identified for McChord AFB. White-top aster, a Species of Concern, occurs on open prairies, and is a remnant element of the Puget lowland grasslands. The species has been found on McChord AFB within degraded prairie habitat and/or former oak savanna habitat. No suitable habitat is found on sites proposed for the Alternative Action.

The threatened water howellia occurs in the Bensten wetland of McChord AFB. The species would not be expected at the Alternative Action sites due to the absence of wetland conditions needed to support the species.

The endangered golden paintbrush is a lowland species that historically occupied gravelly prairies. This perennial is a hemiparasite, with its roots penetrating those of neighboring plants to obtain nutrients and carbohydrates. Wooly sunflower and fescue grasses are some of the known host species. Of the 11 small populations known, only five are

on public lands with some degree of protection. The main threats to conservation are habitat degradation or loss. Most Puget Sound grasslands have been developed for commercial, residential, or agricultural purposes. Compounding habitat loss is encroachment by woody species into grasslands, a function of natural succession. A Recovery Plan has been circulated for the golden paintbrush, which identifies conservation strategies for management of this species on federal lands (USFWS 2000).

Formerly thought to be extinct, Torrey's peavine, a Species of Concern, occurs in a Douglas fir woodland in the Porter Hills area of the Base. This population consists of approximately 100 individuals and is the only population of this species in Washington (USAF 2000c).

Wildlife. Listed wildlife includes: four candidate species of butterflies, and 18 vertebrate species, including the threatened bald eagle (a species that is pending delisting), peregrine falcon (a delisted species) and the Western gray squirrel. Suitable habitat for the listed species at McChord AFB is not found in the potentially affected area associated with the Alternative Action.

The Western gray squirrel (a state threatened and federal Species of Concern) has been observed on McChord AFB in the Porter Hills area, at Morey Pond, at the Ammo Area, and along the Perimeter Road (USAF 2000c). The species may breed at McChord AFB and prefers oak woodland in proximity to wetlands or other water source (USAF 1996). In western Washington, Western gray squirrels are associated with Oregon white oak woodlands and typically occur in areas with a vegetation mosaic of oak woodland, open oak savannah or prairie, oak-conifer-closed canopy forest, wetland, and riparian corridors. In addition, suitable squirrel habitat must include mature oaks capable of producing large acorn crops, year-round food sources (*e.g.*, Ponderosa pine mast, conifer seeds, nuts, fleshy fruits, fungi), cavity and nest trees, and a contiguous tree canopy allowing for arboreal travel between habitat patches (Pierce County 1997).

Military Training Routes

Biological resources within the MTRs associated with the Alternative Action at McChord AFB have been previously documented (USAF 1997). Threatened and endangered species of plants and wildlife that may be present within the MTRs associated with McChord AFB, occurring in Washington and western Idaho, have been described (USAF 1997).

3.2.6.4 Wetlands

Wetlands on McChord AFB were inventoried in 1994. Wetlands on the Base are representative of declining ecosystems once native to the Puget Sound region, although areas have been invaded by exotic vegetation. Wetlands are protected and managed in accordance with Air Force natural resources plans, policies and procedures (USAF 2000c).

Wetlands are found dispersed throughout the western and southern portions of McChord AFB. A total of 23 wetlands encompassing 122 acres are found at McChord AFB. Wetlands on the Base include two streams (Clover Creek and Morey Creek) covering 2 miles

and three ponds (Morey Pond, Carter Lake, and Golf Course Pond) encompassing 7 acres. Most of the wetlands on McChord AFB are classic kettle hole wetlands and are groundwater-influenced systems that do not receive surface water, with the exception of Clover Creek, Morey Pond and other wetlands associated with Morey Pond. Seasonal inundation commonly is greater than several feet in depth and influences the zonation of wetland vegetation communities (USAF 2000c).

No wetlands are found within the industrial area or flightline in the northern portion of the Base. The nearest wetlands are areas associated with Clover Creek west of the flightline, and Morey Pond on the east. Both of these wetlands are designated as federally protected wetlands and are also considered to be navigable waters of the United States (USAF 1998b).

3.2.7 Socioeconomic Resources

McChord AFB is located in Pierce County, part of the Tacoma Primary Metropolitan Statistical Area (PMSA), a component of the Seattle-Tacoma-Bremerton Consolidated Metropolitan Statistical Area (CMSA). McChord AFB is located adjacent to the City of Lakewood and 10 miles mile south of Tacoma. Other nearby cities include Puyallup and Federal Way. Over 50 percent of Pierce County's population is concentrated in these four cities. The on-Base population of McChord AFB is approximately 4,096 (USDOC 2000). Table 3.2.7-1 provides a comparative summary of the population trends from 1990-2000 for these geographic jurisdictions.

Table 3.2.7-1 Population Trends in Pierce County, 1990 through 2000

Geographic Area	2010 Projected Population[1]	Percent Population Change (1990-2000)	2000 Population[2]	1990 Population[3]
Pierce County[4]	788,580	19.5	700,820	586,203
City of Tacoma	NA	9.5	193,556	176,664
City of Federal Way	NA	23.2	83,259	67,554
City of Lakewood[5]	NA	-	58,211	58,412
City of Puyallup	NA	38.2	33,011	23,875
Seattle-Tacoma-Bremerton CMSA	NA	38.9	3,554,760	2,559,164

1 Source: WOFM 2002
2 Source: USDOC 2000
3 Source: USDOC 1990
4 Pierce County is also defined as the Tacoma PMSA.
5 Incorporated in 1996. Defined as a Census Designated Place (CDP) in the 1990 U.S. Census, and boundaries not comparable.
NA Population projections either not available, or not available at this geographic level.

As reflected in Table 3.2.7-1, the population of Pierce County increased by approximately 20 percent between 1990 and 2000, according to the U.S. Census Bureau. Approximately 55 percent of this increase was the result of net in-migration from outside Pierce County. This population growth rate is approximately one-half the growth rate for the Seattle-Tacoma-Bremerton CMSA (39 percent) for the same time period. However, the cities of Puyallup (38 percent) and Federal Way (23 percent) experienced higher growth rates

during this period. A population growth rate of 13 percent is projected for Pierce County over the next 10 years (2000 to 2010) using the "intermediate series" of population projections, and a 22 percent growth rate under the "high series" (WOFM 2002).

3.2.7.1 Housing

Table 3.2.7-2 portrays selected housing characteristics of Pierce County and the cities closest to McChord AFB. The median household income in 2000 was $45,204 for Pierce County, and ranged from $36,422 in Lakewood to $47,269 in Puyallup. According to the 2000 U.S. Census there are 277,060 housing units in Pierce County, a 21 percent increase from 1990. Approximately 63 percent of the housing units are detached single family. In the year 2000, building permits were issued for 6,157 housing units in Pierce County, of which approximately 60 percent were for single-family units (Washington State Center for Real Estate Research [WCRER] 2002).

Table 3.2.7-2 Housing Characteristics in the Vicinity of McChord AFB, 2000

Geographic Area	Total Housing Units	Percent Owner-Occupied	Percent Vacant	Median Value (Owner-Occupied)	Median Monthly Contract Rent	Median Household Income
Pierce County	277,060	60	5.8	$144,400	$554	$45,204
Tacoma	81,037	55	6.0	$123,400	$513	$37,879
Federal Way	32,589	56	3.4	$165,300	$664	$49,278
Lakewood	25,345	48	6.2	$139,800	$493	$36,422
Puyallup	13,385	55	4.5	$154,600	$615	$47,269

Source: USDOC 2000

There are 983 military family housing units on McChord AFB. In addition there are nine dormitories for single personnel, ten quarters for single visiting personnel, and two temporary lodging facilities, with a total capacity of 1,133 (USAF 2001e). Approximately 30 percent of the active duty military personnel live on Base. In the year 2000, building permits were issued for 6,157 housing units in Pierce County, of which approximately 60 percent were for single-family units (WCRER 2002).

According to the 2000 Census, 60 percent of the housing units in Pierce County are owner-occupied with Lakewood having the lowest owner occupancy rate (48 percent). Approximately 6 percent of the housing units were vacant in Pierce County, with Federal Way (3.4 percent) and Puyallup (4.5 percent) having lower vacancy rates. The median value of owner occupied housing was $144,400 in Pierce County in 2000, with median values ranging from $123,400 in Tacoma to $165,300 in Federal Way. Median monthly rents range from $493 in Lakewood to $664 in Federal Way, with the overall county median monthly rent being $554, according to the 2000 U.S. Census. An apartment market survey for Pierce County conducted in September 2001, revealed an average monthly rent of $649 and a 6 percent vacancy rate (WCRER 2002). According to the Tacoma-Pierce County Association of Realtors MLS, there were approximately 2,400 single-family homes listed for sale in Pierce County in December 2002, with over 75 percent within the $100,000 to $200,000 price

range (MLS 2002b). The median price of home resales in Pierce County for the third quarter of 2002 was $174,300 (WCRER 2002).

3.2.7.2 Education

There are six school districts serving Pierce County with kindergarten through 12th grade enrollment approximating 92,000 students. Facilities include 103 primary and elementary schools, 30 middle and junior high schools, 17 high schools, and four continuation/alternative high schools, in addition to numerous private schools. Institutions of higher education include Pacific Lutheran University, University of Puget Sound, Central Washington State University, Evergreen State College, and several community and technical colleges.

The Clover Park School District serves the McChord AFB community in addition to the Fort Lewis Army Post and the City of Lakewood. The district has 26 schools, including 19 elementary schools, four middle schools, two high schools, and one alternative high school, with a total student enrollment of 13,500. Two elementary schools, Carter Lake and Heartwood, are located on McChord AFB. Woodbrook Middle School and Clover Park High School are located just off Base.

3.2.7.3 Economy

Pierce County had an average annual civilian labor force of 328,400 in 2001 with an unemployment rate of 6.4 percent, which was similar to the state of Washington and the Seattle-Tacoma-Bremerton CMSA unemployment rates. The 2001 labor force for Pierce County represented a 5 percent increase over the county's average annual 1995 civilian labor force of 312,900 (Washington State Employment Security Department [WSESD] 2001). Labor force data are based on place of residence and not on place of work. Approximately 25 percent of Pierce County's labor force work outside of the county (WSESD 2001).

Employment by major industry sector, including the government sector, is portrayed for Pierce County for 1995 and 2000 in Table 3.2.7-3. The employment data by industry is based on place of work. As indicated in Table 3.2.7-3, total employment increased by over 31,000, or 10 percent during this 5-year period with the greatest absolute increases in services, finance-insurance-real estate, and construction. Services, government, and retail trade continue to be the largest sector employers comprising approximately 70 percent of the total employment, with these industry sectors projected to continue to absorb the majority of the employment growth during the next 10 years (WSESD 2001). The county's largest employers are government or public-related and include, in addition to McChord AFB, Fort Lewis Army Post, local public school districts, Washington State employees, and Pierce County government employees.

Table 3.2.7-3 Total Full-and Part-Time Employment by Major Industry Sector by Place of Work, Pierce County (2000 and 1995)

Industry Sector	Percent Change (1995-2000)	Percent of Total Employment (2000)	2000 Employment	Percent of Total Employment (1995)	1995 Employment
Farming	-3	<1	2,002	<1	2,068
Agriculture, Forestry, Fishing	27	1	4,592	1	3,623
Mining	5	<1	359	<1	343
Construction	24	6	21,706	6	17,560
Manufacturing	4	7	24,683	8	23,833
Transportation, Commercial, Utilities	14	4	12,768	4	11,231
Wholesale Trade	4	4	13,397	4	12,839
Retail Trade	5	17	57,975	18	55,448
Finance, Insurance, Real Estate	23	8	26,407	7	21,460
Services	19	30	99,643	27	83,504
Government	<-1	22	72,669	24	72,957
Total	10	100	336,201	100	304,866

Source: USDOC 2001

Accompanying the area growth and development has been a commensurate increase in business activity with taxable retail sales of $8.5 billion in 2001 representing a 30 percent increase from 1997 for Pierce County (Washington State Department of Revenue [WSDR] 2001).

McChord AFB is a major contributor to the local and regional economy in the form of employment and purchase of goods and supplies from the business community. McChord AFB is among the largest employers in Pierce County with 9,772 military and civilian employees (USAF 2001e). It is estimated that these jobs create an additional 3,679 indirect jobs in the business community. The annual payroll of $297.6 million for McChord AFB military and civilian employees generates an additional $94 million in wages and salaries for the indirect jobs created. In addition, McChord AFB contributes to the economy in the form of construction and services, and purchase of materials, equipment and supplies. The total annual economic impact of McChord AFB for FY2001 was estimated at $473.5 million for the economic impact region (EIR), which is defined as those counties that are within a 50-mile radius of the Base (USAF 2001e).

3.2.8 Cultural Resources

Other than Base and/or state-specific information, the regulatory and ROI discussion in Subchapter 3.1.8 applies to McChord AFB and the MTRs that would be used for the Alternative Action. The ROI for analysis of cultural resources includes:

- All areas subject to disturbance from facility construction, addition, and alteration accomplished to support the C-17 beddown at McChord AFB as defined in Subchapter 2.4.2.2. The ROI for the Alternative Action on McChord AFB is comprised solely of the built environment (*i.e.*, buildings/structures, paved parking areas, flightline, and minor landscaped areas). One hundred percent of the ROI on McChord AFB has been previously disturbed by some form of activity.
- Figures 2.4.2-1 through 2.4.2-3 show the areas contained within the existing MTR corridors in Washington and portions of western Idaho that would be used for C-17 aircrew training. These areas include the built environment and open space.

A total of 11 cultural resource investigations have been conducted on or near McChord AFB since 1981. Five of these cultural resources investigations have been conducted within or adjacent to the ROI on McChord AFB, as identified on Table 3.2.8-1.

Table 3.2.8-1 Previous Cultural Resources Investigations Within or Adjacent to the McChord AFB Region of Influence

Year	Study
1993	Cultural Resources Assessment and Management Recommendations for McChord AFB
1995	Prehistoric and Historic Archaeological resources at McChord AFB
1996	Inventory of Cold War Properties
1997	Historic Resources Inventory and Evaluation for McChord AFB
1997	Historic American Building Survey (HABS) Documentation

Source: USAF 1998d

The analysis of cultural resources within the area of the Alternative Action and associated MTRs was conducted by reviewing the 1998 McChord AFB Cultural Resources Management Plan (USAF 1998d) and consulting the NRIS database. A search of the NRIS was performed for National Register-listed archaeological sites and historic properties in Washington and Idaho for affected counties. Given the vast area covered by the individual MTRs, and the number of recorded sites on file at the respective SHPOs, only those sites listed in the NRIS database were incorporated into this study. It is assumed that additional potentially eligible sites exist in these study areas, but are not listed in the NRIS.

3.2.8.1 Archaeological Resources

The archaeological resources definition in Subchapter 3.1.8.1 applies to this Subchapter.

McChord AFB

The 1997 Historic Resources Inventory and Evaluation of McChord AFB identified 575 acres on Base with the potential for intact archaeological sites, including 39 historic locations and 10 historic road segments that were systematically investigated (USAF 1998d). No prehistoric remains were identified. The survey identified ten historic archaeological sites and one historic road segment as potentially eligible for the NRHP. The remaining sites were determined to either have been destroyed or lacked the potential to be eligible for the NRHP. None of the 11 historic sites are located within the ROI for McChord AFB.

Military Training Routes

The MTRs cover a broad geographic area in Washington and portions of western Idaho. Areas include the built environment and open space.

Approximately 58 NRHP-listed archaeological sites have been identified beneath the MTR corridors within Washington and Idaho. A total of 38 NRHP-listed sites are located in Washington, while 20 such sites occur in Idaho. However, because the area below the MTRs is vast and large areas are remote, there is a high probability that additional sites remain unrecorded. The recorded archaeological sites within the MTR corridors include burials, cairns, camp sites, canoe manufacturing sites, caves, dwellings, fishing camps, hearths, lithic scatters, middens, mines, mounds, oven pits and sites, petroglyphs and pictographs, rock features, rockshelters, talus pits and features, trails, and village sites. Several archaeological districts are also contained within the MTR corridors.

3.2.8.2 Historical Resources

The historical resources definition in Subchapter 3.1.8.2 applies to this Subchapter.

McChord AFB

The McChord Field Historic District is comprised of 39 contributing structures and 21 non-contributing structures (USAF 1998d). The District is NRHP-eligible under Criterion A for it association with the training of hundreds of pilots between 1939 and 1941 as part of the pre-World War II military buildup. The District is also eligible under Criterion C for its grouping of pre-1947 buildings located within the original Base area that share similar design and construction characteristics. The 1998 ICRMP for McChord AFB identifies 26 additional potentially eligible historic properties located outside the District, but within the boundaries of McChord AFB. These 26 structures have since been determined by the Washington SHPO to be ineligible for the NRHP (Grenko 2003).

The Air Force has defined a conceptual plan for improvements to the McChord Field Historic District. The conceptual plan includes renovation of Wing Headquarters (Bldg. 100) and development of a new Chapel Center with area improvements to circulation, parking and outdoor recreational facilities while enabling the mixed administrative, aircraft operations and maintenance, community services, housing, and industrial functions in this original core of McChord AFB (USAF 2001h).

Military Training Routes

The MTRs cover a broad geographic area in four western states including Washington and Idaho. Areas include the built environment and open space.

Approximately 441 NRHP-listed historic properties have been identified as occurring beneath the MTR corridors within the states of Washington and Idaho. Table 3.2.8-2 identifies the number of sites by state. Structures identified include houses, homesteads and farmsteads (along with associated barns, corrals, and fences), cabins, historic forts and camps, churches, schools, hotels, motels, other commercial buildings, creameries, granaries, tramways, bridges, dams, sawmills, wooden water pipes, logging sites, and rock ovens.

Table 3.2.8-2 NRHP-Listed Historic Properties Within Military Training Route Corridors for the Alternative Action

State	Number of Sites
Washington	283
Idaho	158
Total	441

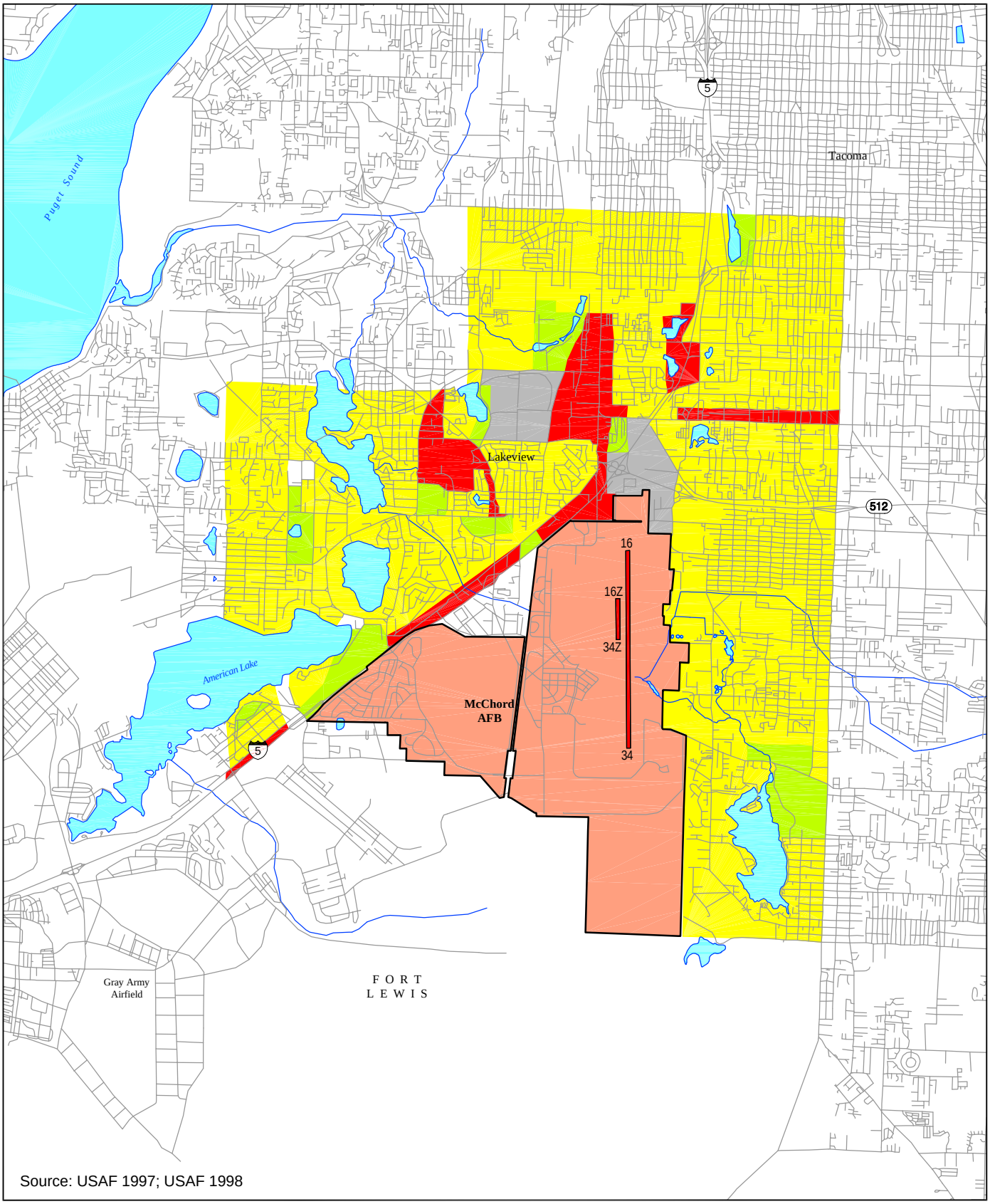
3.2.8.3 Native American Interests

The Native American resources discussion in Subchapter 3.1.8.3 applies to this Subchapter. The ROI for traditional resources associated with project activities includes extensive areas throughout Washington and Idaho.

During preparation of the McChord C-17 Beddown EA in 1996, the Air Force contacted the Colville Confederated Tribes, Spokane Nation, and the Wanapum People [not federally recognized at that time] in Washington, and the Nez Perce Tribe in Idaho to identify Native American resources and concerns within the ROI. The Air Force also contacted the Coeur d'Alene Tribe, which declined consultation. Consultation consisted of a presentation on the proposed beddown and operation of C-17 aircraft to each tribe followed by an open discussion of any issues or concerns.

The Colville Confederated Tribes expressed concerns about potential conflicts of priorities between the C-17 aircraft on a MTR and aircraft used for firefighting and wildlife counting; the number of nighttime operations; the aircraft noise while over the reservation; overflight of cultural events and sites; and, overflight of recreational areas along the Columbia River.

The concerns of the Spokane Nation included the potential for aircraft noise to cause landslides that could affect burial and other cultural sites; conflict of priorities between the



Source: USAF 1997; USAF 1998

McChord Air Force Base

LEGEND

- McChord AFB
- Commercial
- Residential
- Water
- Industrial
- Vacant
- Recreational
- Runway
- Roadway

7,000 0 7,000
Miles

N

742463 MC–OBLU.DWG

Off-Base Land Use Near McChord AFB

Figure 3.2.9-1

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C-17 on a MTR and aircraft used for firefighting and wildlife counting; and, aircraft noise in the area along the Columbia River and Fork Lake.

The Wanapum People were concerned about overflight of sacred sites and disturbance of ceremonies conducted throughout the year. The concerns of the Nez Perce Tribe included conflict between the C-17 on an MTR and aircraft used for firefighting and wildlife counting, aircraft noise, and overflight of the Pilot Knob area.

As a result of these consultations, the Air Force established a toll-free number that can be used by tribal representatives and other organizations to inform the Air Force of concerns regarding C-17 overflights. The open line of communication is used to inform the Air Force when aircraft overflights affect tribal activities so that C-17 operations may be temporarily redirected.

Four Native American groups that could be affected by the Alternative Action on McChord AFB have been identified. Seven groups have been identified within the MTR ROI associated with the Alternative Action. Table 3.2.8-3 lists the Native American tribes/groups that could be affected by the Alternative Action. All groups shown on this table are federally-recognized, with the exception of the Wanapum People. To ensure that any sites of traditional cultural value are identified and adequately considered under the Alternative Action, the Air Force sent correspondence to the tribes announcing the action and requesting concerns regarding the Alternative Action (see Appendix C).

Table 3.2.8-3 Native American Interested Parties by State, Alternative Action

State	Tribal Name	McChord AFB	MTRs
Washington	Colville Confederated Tribes	•	•
	Puyallup Indian Tribal Council	•	
	Nisqually Indian Community Council	•	
	Spokane Nation	•	•
	Wanapum People		•
	Kalispel Tribe		•
Idaho	Coeur d'Alene Tribal Council		•
	Kootenai Tribal Council		•
	Nez Perce Tribal Committee		•

3.2.9 Land Use

3.2.9.1 McChord AFB

The McChord AFB General Plan provides guidance for land use and development on the Base. Land use patterns on McChord AFB have evolved from two historic runway configurations. The McChord historic district mirrors the original northwest-southwest orientation of the runway and installation prior to the 1950s. Development patterns after 1960 reflect the north-south runway orientation. Accompanied housing and the community center

have been established in the southwest portion of the installation, away from industrial areas and the airfield.

An uninhabited part of the Fort Lewis Military Reservation is located south of McChord AFB. A number of communities are in the vicinity of the Base including the incorporated town of Lakewood, and the unincorporated areas of Tillicum, Ponder's Corner, Parkland, and Spanaway. Land use in the immediate vicinity of the Base is predominantly a mixture of residential, commercial, industrial, recreational, open space, and water (see Figure 3.2.9-1). Residential uses are located to the northwest and east of the Base, with a significant commercial district directly north of the Base. Commercial uses continue from this commercial district along Interstate 5, southwest of the Base. Several recreational land uses are located near the Base. Numerous bodies of water also exist near McChord AFB including American Lake, Gravelly Lake, and Steilacoom Lake.

Land Use Plans and Zoning Regulations

In 1992, a Joint Land Use Study (JLUS) was developed for the area surrounding McChord AFB. The JLUS is a comprehensive study of land uses adjacent to McChord AFB, and addresses McChord AFB, Fort Lewis, Camp Murray (Washington National Guard), and 10 local governments surrounding these installations. The goal of the JLUS is to encourage compatible development and redevelopment of areas around the military installations, while balancing the needs of the local communities with the military mission. JLUS recommendations include:

- Air Force purchase of the remainder of CZ acreage north of McChord AFB;
- Prohibiting residential and other concentrated land uses from the CZ until purchase of the property has been accomplished;
- Limiting incompatible land uses within the APZs; and
- Continued aircraft noise monitoring and increased buffer areas to minimize adverse effects to local communities.

The Comprehensive Plan for Pierce County manages growth on land within Pierce County. The comprehensive plan sets forth goals and objectives for overall planning and coordination among Pierce County and its cities and towns, and among adjacent counties. Within Pierce County, zoning is consistent with the future land uses proposed within the comprehensive plan. Generalized proposed land uses include a mixed use district (concentration of commercial, office, and multifamily residential developments) to the north and west of McChord AFB, moderate-density single-family residential areas to the west and east, and a high-intensity employment center (heavy industrial and manufacturing) to the north and east. Pierce County land located west of McChord AFB is zoned for moderate-density single-family residential and commercial/office uses.

The City of Lakewood is primarily comprised of residential, commercial, and industrial land uses. The generalized existing land uses are consistent with the Pierce County Comprehensive Plan. The City of Lakewood Interim Comprehensive Plan and the City of Lakewood Interim Zoning Code provide policies and objectives for management of the city's

growth. The future land uses proposed within the city's interim comprehensive plan are compatible with the city's Zoning Code. The city's comprehensive plan does incorporate recommendations from the JLUS. However, the city has approved incompatible land use zoning and development for properties within the expanded CZ area. Land west and north of McChord AFB is zoned for residential, commercial, and industrial uses. Land adjacent to the southwest corner of the Base is zoned for residential uses.

3.2.9.2 Grant County Airport

The Grant County Airport is located northwest of Moses Lake in Grant County, Washington. On-site land uses include airfield, aviation support, and industrial. Adjacent land uses include sparsely developed areas of agricultural, industrial, and public facilities. Zoning adjacent to the airport is consistent with the land uses for the area. The majority of the surrounding area is zoned for agricultural and industrial uses. Small areas zoned for residential uses are located on the north, south, and east sides of the airport. Areas south of the airport are zoned for public facilities and commercial uses.

3.2.9.3 Military Training Routes

The land use areas affected by proposed operations on the MTRs consist of those lands directly beneath routes. Baseline land use conditions under the McChord AFB MTRs are based on the McChord AFB C-17 Beddown EA and updated with current population and land use data. The area potentially affected by the MTRs involves primarily rural regions of Washington and Idaho. Broad areas of cropland and range land are present, as are scattered population centers, including a few larger towns and cities. A review of existing land uses that underlie the MTRs identified the following generalized land uses: urban/populated areas, industrial, recreational areas, agricultural, commercial, and transportation corridors.

Land uses associated with urban/populated centers underlying these routes include residential, commercial, industrial, and institutional (*e.g.*, schools, hospitals). Table 3.2.9-1 lists the baseline low-level routes and the urban/populated centers associated with each route. The population data provided in Table 3.2.9-1 was obtained from the 2000 U.S. Census.

Table 3.2.9-1 Urban/Populated Lands Under Alternative Action Military Training Routes

MTR	Urban/Populated Area/Population[a,b]
IR-324/325	Ritzville/1,736; Harrington/426; Davenport/1,730; Creston/232; Wilbur/911; Mansfield/298; Quincy/5,196
IR-326	Lind/585; Ritzville/1,736; Endicott/621; Mesa/441; Basin City/850; Moses Lake/14,951; Warden/2,540; Kahlotus/257; Connell/2,930
IR-327/328	Creston/230; Lincoln/10,184; Nespelem/269; Bridgeport/2,099; Mansfield/298; Quincy/5,196; Moses Lake/14,951; Wilson Creek/201; Almira/321
IR-329	Warden/2,540; Othello/5,750; Connell/2,930; Mesa/441; Wallula/227; Benton City/2,533; Prosser/4,599; Mattawa/2,703; Moses Lake/14,951
IR-330	Lind/585; Odessa/969; Hartline/142; Coulee City/615; Moses Lake/14,951; Warden/2,540
IR-340	Coulee City/615; Almira/321; Wilbur/911; Creston/230; Springdale/323; Chewelah/2,196;

MTR	Urban/Populated Area/Population[a,b]
	Sandpoint/6,835; Lewiston/30,904; Endicott/621; St. John/568; Cheney/8,972
VR-331	Salkum/320; Mossyrock/450; La Grande/100; Eatonville/1,435; McKenna/300; Yelm/1.365

Population figure source: US Bureau of the Census, April 2000. Urban/populated areas listed are those shown on the low-level route corridor maps, with a population listed in the 2000 Census of Population and Housing.

There are several national forests, parks, recreation areas, wildlife refuges, and wilderness areas beneath the MTRs, as well as numerous state parks and recreation areas. Table 3.2.9-2 presents updated data from the McChord C-17 Beddown EA and describes the recreational lands beneath the low-level routes by route segment. In addition to these areas, many of the MTRs are over the BLM Border and Wenatchee Resource areas. These resource areas contain many recreational opportunities such as picnicking, camping, hunting, fishing, swimming, boating, hiking, horseback riding, rockhounding, hang gliding, and wildlife viewing. Within the Wenatchee Resource Area, the major recreational opportunities near the MTRs are Saddle Mountain (hang gliding, rockhounding, and off-highway vehicle riding); Yakima River Canyon (fishing, floating, camping, wildlife viewing, hiking, and paragliding); Douglas Creek/Moses Coulee (fishing, hunting, and camping); and Chelan Butte (national hang gliding competitions). The main recreational areas in the Border Resource Area near the MTRs are the Juniper Dunes Wilderness and the North Slope of Horse Heaven Hills (hang gliding, wildlife viewing, and hiking).

Table 3.2.9-2 Recreational Lands Under Alternative Action Military Training Routes

Recreational Area/Location	MTR	Description
Federally-Protected Recreational Lands		
Columbia National Wildlife Refuge/Adams and Grant counties	IR-326, IR-329, IR-330	Wildlife viewing seasons are spring, fall, and winter. Activities include boating, fishing, hunting, and camping.
McNary National Wildlife Refuge/Walla Walla County	IR-329	Wildlife viewing season is fall. An environmental study area is within the refuge. Activities include hiking, hunting, and fishing.
Saddle Mountain National Wildlife Refuge/Franklin County	IR-329	Wildlife viewing
Juniper Dunes Wilderness/Franklin County	IR-329	Public recreation, wildlife viewing
Coulee Dam National Recreation Area/Grand Coulee Dam	IR-327/ 328	Activities include sightseeing, picnicking, camping, fishing, boating, and hunting.
Turnbull National Wildlife Refuge, Spokane County	IR-340	Wildlife viewing, public recreation
Nez Perce National Forest, Idaho County	IR-340	Wildlife viewing, public recreation
Clearwater National Forest, Clearwater County	IR-340	Wildlife viewing, public recreation
St. Joe National Forest, Benewah County	IR-340	Wildlife viewing, public recreation
Coeur d'Alene National Forest, Kootenai County	IR-340	Wildlife viewing, public recreation
Kaniksu National Forest, Kootenai County	IR-340	Wildlife viewing, public recreation
Kaniksu National Forest, Booner County	IR-340	Wildlife viewing, public recreation

Recreational Area/Location	MTR	Description
Kaniksu National Forest, Pend County	IR-340	Wildlife viewing, public recreation
Steamboat Rock State Park/8 miles south of Grand Coulee	IR-324/325 IR-327/328	Public recreation, wildlife viewing
Potholes State Park and Recreation Area/25 miles southwest of Moses Lake	IR-330	Public recreation, wildlife viewing
Central Ferry State Park/34 miles southwest of Colfax	IR-326	Public recreation, wildlife viewing
Bridgeport Recreation Area/3 miles northeast of Bridgeport	IR-327/328	Public recreation, wildlife viewing
Sun Lakes State Park/7 miles southwest of Coulee City	IR-330	Public recreation, wildlife viewing
Moses Lake Recreation Area/5 miles west of Moses Lake	IR-326, IR-327/328, IR-329, IR-330	Public recreation, wildlife viewing
Winchester State Park, Lewis County	IR-340	Public recreation, wildlife viewing
Mount Baker-Snoqualmie National Forest, Lewis County	VR-331	Wildlife viewing, public recreation
Ike Kinswa State Park and Recreation Area/on Mayfield Lake	VR-331	Wildlife viewing, public recreation

3.2.10 Infrastructure and Utilities

3.2.10.1 Water Supply

The McChord AFB water system service area is defined by Base boundaries. Eleven production wells and five elevated storage tanks supply water for McChord AFB. The drinking water system consists of three subsystems (Base, SAGE, and Residential) constituting a single pressure zone that can be interconnected or isolated as needed. The tenth well became operational last year and the eleventh well is currently in the process of being brought online. Both wells are part of the Base subsystem. at or near capacity during the summer when irrigation and water usage is at its peak (USAF 1996). During this time, the combined output of the Family Housing wells is not capable of meeting demand without depleting storage. During peak demand, the interconnection between the Residential and SAGE subsystems is opened. The Base subsystem has two storage reservoirs with a combined capacity of 450,000 gallons; the SAGE subsystem has a 250,000-gallon reservoir; and the Residential subsystem has two reservoirs with a combined storage capacity of 525,000 gallons (Wyatt 2003).

The total consumption for the Base and SAGE subsystems combined during 2001 (January through December) was 302.8 MG with the peak monthly demand of 36.9 MG in August and the low monthly demand of 19.5 MG in November. Total consumption for the Residential subsystem during 2001 (January through December) was 126.2 MG with the peak monthly demand of 22.1 MG in July and the low monthly demand of 5.9 MG in February (Wyatt 2003). The total amount of water used in CY 01 was 429 MG or about 119 gal/day/person.

3.2.10.2 Waste Water Treatment

Wastewater treatment for McChord AFB is provided by Fort Lewis, which also serves portions of the City of DuPont, and the American Lake Veterans Medical Center. The plant at Fort Lewis operates under a single NPDES permit. The wastewater treatment plant has a treatment capacity of 7 MGD. Currently the plant is operating at an average annual level of 3.1 MGD. The plant provides primary and secondary treatment and discharges through a deep-water outfall into Puget Sound. The biosolids are sent to an instate contractor who applies the biosolids to a landfarming operation (McGonkey 2003).

The Base and SAGE subsystems have a capacity of 3.59 mgd with a maximum average daily demand of 2.5 mgd. With the addition of the two new wells at the Base subsystem, the capacity has been increased from 3.59 mgd to 4.86 mgd. The Residential subsystem operates

Wastewater from McChord AFB is discharged via two lines by gravity drainage; wastewater from the commercial portion of the Base is conveyed through an 18-inch line and wastewater from the housing portion of the Base is conveyed through a 15-inch line to Fort Lewis. The most recent data available indicate that McChord AFB sent 11.57 MG of wastewater from the commercial portion of the Base and 9.5 MG of wastewater from the housing portion of the Base to Fort Lewis in January 1999 (Herricks 2003). The annual daily average of wastewater sent to Fort Lewis through both pipelines from McChord AFB is approximately 800,000 gallons per day, which is equivalent to about 81.2 gal/day/person (McGonkey 2003).

3.2.10.3 Storm Water Management

The area on McChord AFB affected by the proposed C-17 beddown lies within the Clover Creek drainage basin. The existing storm drainage system consists of gravity sewers connected to oil/water separators and industrial waste collection and disposal systems with eventual outflow into the creek. No direct connections are allowed to Clover Creek without effective oil/water separation. The existing 48-inch stormwater trunk south of West Street has an existing capacity of 38 cubic feet per second which is adequate to handle existing flows. Discharge into Clover Creek is in accordance with NPDES permit requirements and the Base submits reports on water quality at regular intervals and complies with permit requirements.

Surface waters at McChord AFB include Morey Creek, Clover Creek, Spanaway Lake, Steilacoom Lake, Sequalitchew Creek, and Sequalitchew Lake. Morey Creek originates at Spanaway Lake approximately 0.5 mile east of the Base and merges with Clover Creek near the eastern border of the Base. Clover Creek enters the Base from the northeast and flows through a 1,200-foot long culvert beneath the runway and taxiway. It is then channeled around the northern industrial area, and exits the Base on the western boundary, and flows towards Steilacoom Lake, located approximately 2 miles northwest of the Base (USAF 1992). Stormwater runoff from the Base is discharged to Clover Creek after receiving treatment to remove oil, grease, and solids at one of six oil/water skimmers and numerous other oil/water separators located on the Base (Martins 2003). Sequalitchew Creek originates at

Sequalitchew Lake located southwest of the Base on the Fort Lewis Military Reservation. Sequalitchew Creek flows northwest to Puget Sound, located approximately 5 miles northwest of the Base.

Water quality monitoring is performed at the inlet of Clover Creek at the eastern boundary of the Base, and at the creek outlet on the western boundary of the Base. Parameters analyzed include pH, oil and grease, phenols, lead, mercury, silver, phosphate, and nitrates. Monthly discharge monitoring is performed as required by the Base's NPDES permit at four of the six oil/water separators located on the Base. NPDES permit limits are established for oil and grease (15 milligrams per liter [mg/L]), and pH (6.5 to 8.5). Monthly monitoring results are reported to the USEPA (Martins 2003).

Impervious areas at McChord AFB total approximately 35 percent, or about 1,616 acres. Runoff from the paved areas and parking lots enters the storm drain system, which conveys storm water away from impervious surfaces and reduces the potential for flooding.

3.2.10.4 Energy

Electricity

Electrical power to McChord AFB is supplied by Tacoma Public Utilities through two substations, the Gingko Substation and the McChord Substation. The Gingko Substation provides electricity to approximately 900 housing units and the McChord Substation provides electricity for the Base. The total capacity of each substation is 20 megavolt amperes (MVA). The current maximum demand in the winter is approximately 6.5 megawatts (MW) and 11 MW for the Gingko and McChord substations, respectively. During the summer, the loads are 3 and 6 MW for the Gingko and McChord substations, respectively (Curley 2003). During FY02, housing units used 25,700 MW-hours (70 MW-hours/day) and the Base used 69,600 MW-hours (190 MW-hours/day) for a total of 95,300 MW-hours (260 MW-hours/day) (Yaeger 2003). It is estimated there are about 194.2 acres (8,459,352 square feet) of building space on McChord AFB. This is equivalent to about 3.1×10^{-5} MW-hours per day per square foot of building space.

Natural Gas/Heating

Heating energy on McChord AFB is provided by natural gas and fuel oil. Both committed and interruptible natural gas are supplied to McChord AFB by Washington Natural Gas, with fuel oil supplementing interruptible gas supplies. The fuel oil, which is stored in a 370,000 gallon tank at the steam plant, is used during emergency situations when natural gas is temporarily unavailable. The plant consists of two 100,000 pounds per hour (PPH) boilers and one 50,000-PPH boiler. Seasonal loads average between 11,000 and 15,000 PPH during the summer and between 35,000 and 45,000 PPH during the winter. Peak loads as high as 60,000 PPH are typical during the winter. The existing facility is estimated to have a 30-year life with sufficient capacity to handle twice the existing peak seasonal loads with a boiler off line for maintenance (HNTB 1996).

During FY02, the total quantities of natural gas consumed were 306,900 thousand cubic feet (KCF) at the steam plant, 52,300 KCF for small buildings around the Base and 7000 KCF for about 100 housing units for a total quantity of 366,200 KCF (Yaeger 2003). With approximately 194.2 acres of building space on the Base, this equates to about 1.12 $x10^{-4}$ KCF per day per square foot of building space.

3.2.10.5 Solid Waste Management

Solid waste at McChord AFB is collected from both the commercial and family housing portions of the Base, transported 50 miles south to Centralia, Washington and then shipped by rail line to an eastern Washington landfill. In September 2002, the solid waste was collected from both the housing and commercial portions of the Base and transported to a municipal landfill in Puyallup, located 15 miles southeast of the Base. During FY 2002, military housing generated 1051 tons of waste of which 56 tons were collected through drop boxes. Base commercial facilities generated 2,141 tons of waste of which 215 tons were collected through drop boxes (Herricks 2003).

Solid waste from both the commercial and housing portions of the Base is collected by Lemay, Inc. and transported to the Puyallup municipal landfill. The landfill receives municipal waste from Pierce County and is expected to be open until 2030 based on an annual rate of 300,000 tons. The landfill was opened in 2001 (Bender 2003).

3.2.10.6 Transportation Systems

Vehicular traffic enters and exits McChord AFB through four gates:

- Main Gate - located on Bridgeport Way SW near McChord Drive;
- North Gate - located on South Tacoma Way near 112th Street;
- West Gate - located on Woodbrook Road just south of Interstate 5; and
- East Gate - located on Military Road near Perimeter Road.

The Main Gate accommodates the majority of installation traffic and is open 24 hours a day. The North Gate and East Gate are open during peak traffic hours and have strong vehicular movements during the early morning commuter arrival, over lunchtime, and at the end of the workday. The West Gate primarily serves the Base residential area and has varying peak hour characteristics. The Main Gate has two inbound and two outbound lanes at the gate. All other gates have one inbound and one outbound lane, except the West Gate, which has two outbound lanes.

Several on-Base arterial streets serve the installation. Lincoln Boulevard connects the family housing area on the west side of the Base to the main Base to the east. Lincoln Boulevard intersects A Street and Outer Drive, two north-south arterial roadways. Perimeter Road, also an arterial street, runs east and west along the perimeter of the Base, providing a connection for facilities on the east and west side of the runway. There are three main collector streets on the Base: 5th Street, 6th Street, and Woodbrook Road. Fifth Street parallels Clover Creek and connects A Street to Tuskegee Airmen Boulevard. Sixth Street

parallels the aircraft maintenance facilities at the southern edge of the runway, connecting Outer Drive to Tuskegee Airmen Boulevard. Woodbrook Road serves as a circular collector loop through family housing, connecting with Lincoln Boulevard and the main Base area.

Interstate 5 is a vital north-south transportation corridor located west of the Base, affording easy access to McChord AFB. Interstate 5 connects to several state highways north of the Base. East-west vehicular traffic is provided north of McChord AFB via State Route 512, which intersects Interstate 5 north of the Base, and provides access to the Base via the Steele Street interchange and local streets. Further north near Tacoma, State Highway 16 branches off of Interstate 5 and continues northwest, crossing over Puget Sound. Interstate 5 continues north to eventually intersect with Interstate 705, which connects to downtown Tacoma. Rail linkage is available through McChord AFB via the Burlington Northern Railroad, whose right-of-way bisects the installation into eastern and western sections.

3.2.11 Airspace and Airfield Operations

3.2.11.1 McChord AFB

Airspace Operations

The airspace ROI selected for study includes the airspace within a 20 NMs radius of McChord AFB from the ground surface up to and including 10,000 feet MSL. This represents a three-dimensional volume of airspace reserved to support aircraft operations at and around Seattle-Tacoma and McChord AFB. Radar vectoring, sequencing, and separation service between participating VFR and all IFR aircraft operating within this airspace is provided by Seattle-Tacoma terminal radar approach control (TRACON). Arrivals and departures at McChord AFB, as well as aircraft transiting the airspace, are controlled by Seattle TRACON. Seattle Air Route Traffic Control Center controls the airspace surrounding TRACON airspace. Approximately 3,840 annual C-17 sortie aircraft operations (11 per day) are anticipated within the ROI airspace (USAF 1997).

There is one military and 10 public use airports, as well as 13 private use airports, within or adjacent to the controlled airspace associated with the McChord AFB ROI. Eight low-altitude federal airways pass through or near the ROI. The northern boundary of the Fort Lewis restricted area, R-6703A/B/C, and the Rainier 1/2/3 military operations areas lie approximately 7 miles to the southwest of McChord AFB.

Airfield Operations

McChord AFB has two runways, one primary instrument runway and one runway used to practice C-130 assault landings. The main runway (16/34) is 10,100 feet long and 150 feet wide. The assault landing runway, located west of and parallel to the main runway, is 3,300 feet long and 60 feet wide. The airfield elevation is 323 feet MSL and the air traffic control tower is operational 24 hours a day, 7 days a week. Figure 3.2.3-2 shows the McChord AFB airfield.

Seattle TRACON provides radar service to aircraft arriving and departing McChord AFB. There are five instrument approaches available for arrivals to the airfield. Tower-controlled traffic patterns are flown on both sides of the runways at 1,200 feet AGL for rectangular patterns and 1,800 feet AGL for overhead patterns.

The majority of aircraft operations at McChord AFB are generated by assigned C-17 aircraft. Table 3.2.11-1 presents the average daily and total yearly operations at McChord AFB.

Table 3.2.11-1 Annual and Average Daily Airfield Operations, Baseline, McChord AFB

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
C-17	9,626	26.74	12,306	34.19	21,932	60.93
Transient						
A-6	310	0.86	0	0.00	310	0.86
A-10	130	0.36	0	0.00	130	0.36
C-5	266	0.74	0	0.00	266	0.74
C-9	684	1.90	2,592	7.20	3,276	9.10
KC-10	72	0.20	0	0.00	72	0.20
C-12	360	1.00	0	0.00	360	1.00
C-21	166	0.46	0	0.00	166	0.46
C-130	986	2.74	533	1.48	1,519	4.22
KC-135	230	0.64	0	0.00	230	0.64
C-141	296	0.82	0	0.00	296	0.82
F-15	172	0.48	144	0.40	316	0.88
F-16	130	0.36	396	1.10	526	1.46
F-18	194	0.54	0	0.00	194	0.54
P-3	310	0.86	2,349	6.53	2,659	7.39
T-33	94	0.26	0	0.00	94	0.26
T-38	194	0.54	0	0.00	194	0.54
B-747	80	0.22	0	0.00	80	0.22
L-1011	58	0.16	0	0.00	58	0.16
B-737	80	0.22	0	0.00	80	0.22
Learjet	50	0.14	0	0.00	50	0.14
Helicopter	172	0.48	0	0.00	172	0.48
subtotal	5,034	13.98	6,014	16.71	11,048	30.69
Total	14,660	40.72	18,320	50.90	32,980	91.62

Source: USAF 1997.

3.2.11.2 Grant County International Airport

Airspace Operations

The Grant County Airport is located in the central area of the State of Washington, approximately 85 miles west-southwest of Spokane. The airspace ROI includes the volume of airspace within a 20 NMs radius of the airport from the ground surface up to and including 10,000 feet MSL. This airspace is controlled by Grant County TRACON, which provides radar vectoring, sequencing, and separation service for VFR and IFR aircraft operating within the airspace. Arrivals and departures at the Grant County Airport, as well as aircraft transiting TRACON airspace, are controlled by TRACON between the hours of 6:00 a.m. to 10:00 p.m. At other times, Seattle ARTCC controls aircraft operations within this airspace. Seattle ARTCC controls the airspace surrounding TRACON airspace. About 2,867 annual sortie aircraft operations (eight per day) by McChord AFB C-17 aircraft are anticipated within the ROI airspace (USAF 1997).

There is one private and five public use airports within or adjacent to the controlled airspace associated with the Grant County Airport ROI. Seven low-altitude federal airways pass through the ROI. The Okanogan and Roosevelt military operations areas are located approximately 50 miles north of Grant County International Airport, and the Yakima Training Center restricted area (R-6714) is located 35 miles to the southwest.

Airfield Operations

The airfield consists of two primary instrument runways (14L/32R and 04/22), and two shorter runways (14R/32L and 18/36). Additionally, Runway 09/27, which is 4,500 feet long and 90 feet wide, is for C-17 assault landings. Runway 04/22 is oriented northeast/southwest and is 9,999 feet long and 100 feet wide. Runway 14L/32R is oriented northwest/southeast and measures 13,502 feet long and 200 feet wide. The two shorter runways are located to the west of the primary runways. Runway 14R/32L measures 3,025 feet long and 75 feet wide. Runway 18/36 is 3,263 feet long and 75 feet wide. Airport elevation is 1,185 feet MSL. The Grant County air traffic control tower operates between 6:00 a.m. and 10:00 p.m. daily. Figure 3.2.3-4 shows the airfield.

Grant County TRACON provides radar service to aircraft arriving and departing the airport. Five instrument approach procedures are available for arrivals to the Grant County International Airport. Aircraft traffic pattern altitudes are 1,000 feet AGL for rectangular patterns and 1,500 feet AGL for overhead patterns.

Aircraft operations at Grant County Airport are a mix of military, civil, air taxi, and general aviation activities. Military operations include instrument and visual traffic pattern work, assault landing operations, and return to home station, all in one day. Table 3.2.11-2 summarizes Grant County Airport aircraft operations.

Table 3.2.11-2 Annual and Average Daily Airfield Operations, Baseline, Grant County Airport

	Arrivals and Departures		Closed Patterns		Total	
Aircraft	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**	**Annual**	**Avg. Daily**
Military						
C-17	427	1.16	1,605	4.40	2,032	5.56
C-17 ALZ	7,845	21.78	31,378	87.14	39,223	108.92
C-17 Subtotal	8,272	22.94	32,983	91.54	41,255	114.48
A-6	135	0.38	542	1.52	677	1.90
C-130	406	1.16	1,626	4.44	2,032	5.60
P-3	1,084	3.08	4,336	12.02	5,420	15.10
subtotal	1,625	4.62	6,504	17.98	8,129	22.60
military subtotal	9,897	27.56	39,487	109.52	49,384	137.08
Civil Training						
B-747	5,000	13.96	22,776	63.27	27,776	77.23
B-767	437	1.36	1,993	5.44	2,430	6.80
B-777	437	1.36	1,993	5.44	2,430	6.80
B-737	375	1.16	1,708	4.64	2,083	5.80
subtotal	6,249	17.84	28,470	78.79	34,719	96.63
Air Taxi						
Metro III	4,787	13.30	0	0.00	4,787	13.30
Beech 18	266	0.70	0	0.00	266	0.70
D- 28	266	0.70	0	0.00	266	0.70
subtotal	5,319	14.70	0	0.00	5,319	14.70
General Aviation						
SE	15,736	43.78	38,525	106.92	54,261	150.70
TE	482	1.28	5,545	15.42	6,027	16.70
TP	468	1.30	0	0.00	468	1.30
jet	468	1.30	0	0.00	468	1.30
subtotal	17,154	47.66	44,070	122.34	61,224	170.00
Total	46,891	130.70	145,010	402.19	150,646	532.89

Note: SE=single engine; TE=twin engine; and TP=turboprop.

Source: USAF 1997

3.2.11.3 Military Training Routes

The 266 monthly and 3,200 annual MTR operations assessed as the Proposed Action in the McChord AFB C-17 Beddown EA are detailed in Table 2.4.1-4 and are used as the baseline condition for this EA. Figure 2.4.1-1 depicts the location of the nine MTRs, which are managed and flown using the processes and procedures identified in Subchapter 3.1.11.2. In addition to the C-17, other aircraft types such as C-130s fly IRs-324 through 330 about two times per month for each route, while EA-6 aircraft fly IR-340 about two times per month. Resources such as airspace management, other airports, low altitude federal airways, special use airspace, and military training routes in the vicinity of the MTRs, as well as flight restrictions, were described and used for assessing potential impacts from MTR sortie aircraft operations. It is estimated that about 1,766 hours are flown annually by C-17 aircraft on the nine MTRs. There would be no change to the structure (*i.e.*, entry and exit points, altitudes,

corridor widths, route points, *etc.*) of any of the nine MTRs under the Alternative Action. Likewise, there has been no change to the other elements (federal airways, other MTRs, airports, *etc.*) in the airspace adjacent to the nine MTRs. Refer to the McChord C-17 Beddown EA for detailed information concerning the nine MTRs. The air traffic control processes and procedures identified in the baseline description for the routes that would be used for the Proposed Action (*i.e.,* Subchapter 3.1.11.2) are used for the McChord AFB-related MTRs.

3.2.11.4 Aircraft Safety

The aircraft accident distribution and general Class A mishap data in Subchapter 3.1.11.3 apply to McChord AFB, Grant County Airport for military aircraft, and the MTRs flown by the Base's aircrews. Table 3.2.11-3 lists the number of class A mishaps, the lifetime class A mishap rate, the number of years for which data are maintained, and the cumulative flight hours for the C-17 aircraft. The table reflects the Air Force-wide data for all elements of all missions and sorties for the aircraft.

Table 3.2.11-3 C-17 Class A Aircraft Mishap Information

Aircraft	Class A Mishaps	Class A Mishap Rate	Years of Data	Cumulative Flight Hours
C-17	5	1.22	12	410,690

Note: The mishap rate is an annual average based on the total mishaps and 100,000 flying hours. The greatest number of Class A mishaps in any one year for the C-17 is two mishaps.

Sources: USAF 2003c.

3.2.11.5 Bird-Aircraft Strike Hazard

The background and BASH plan information in Subchapter 3.1.11.4 applies to McChord AFB. The McChord AFB C-17 EA anticipated a total of 30 annual bird strikes for a 48 aircraft condition (USAF 1997). Of these, 12 bird strikes would occur at McChord AFB, 17 off Base, and one would be unknown. Most of the bird strikes (19) would occur during takeoff/landing and climb/approach, four during MTR operations, seven during en route descent, and one would be unknown.

3.2.12 Environmental Management

3.2.12.1 Pollution Prevention

The discussion for pollution prevention at Travis AFB in Subchapter 3.1.12.1 applies to McChord AFB. The Air Force has prepared and implemented a Pollution Prevention Plan for McChord AFB covering the years 1998 to 2003. The plan describes the status of the environmental restoration and associated compliance programs.

3.2.12.2 Asbestos and Lead-based Paint

Asbestos

The discussion for asbestos management for Travis AFB in Subchapter 3.1.12.2 applies to McChord AFB. Asbestos surveys at McChord AFB have been performed in the past and these surveys are used as indicators of potential ACM presence in older facilities. Inspections for asbestos are conducted for planned construction projects to detect, identify, locate, and quantify all exposed and concealed ACM. Buildings on McChord AFB were constructed when ACM use was common. Due the to the age of these buildings, ACM may be present in properties that have not been completely renovated. It is also possible that water lines on the Base are made of concrete containing asbestos.

Lead-based Paint

The discussion for LBP management for Travis AFB in Subchapter 3.1.12.2 applies to McChord AFB. The Air Force does not have a Lead-Based Paint Management Plan for McChord AFB because past studies conducted by Base Bioenvironmental Engineering indicated that LBP is not a major problem on the Base (Grenko 2002). Due to the age of construction, it is possible that some of the buildings on McChord AFB may contain LBP.

3.2.12.3 Environmental Restoration Program

Historical industrial activities conducted at McChord AFB have resulted in the contamination of several areas. As part of its proactive commitment to restore and protect the environment, McChord AFB has initiated an environmental cleanup program to identify, investigate, and remediate identified contaminated sites. The Base has a total of 65 ERP sites, 64 of which have no further response action planned, requiring no further actions beyond those that are currently being conducted. Figure 3.2.12-1 shows the locations of ERP sites.

The Base had two sites on the NPL: the Washrack/Treatment Area; and the Area D/American Lake Garden Tract. In 1996, the Washrack/Treatment Area site was deleted from the NPL. The trichloroethene and dichloroethene contamination found in the shallow groundwater beneath a small portion of the residential area of the American Lake Garden tract site was found to have originated from an inactive landfill in Area D of the Base. The contaminated groundwater was treated and a drinking water system was piped in to the area. A long-term monitoring program is ongoing to ensure effectiveness of the cleanup. Other monitoring wells associated with ongoing investigations of subsurface contamination are present on McChord AFB.

3.2.12.4 Geology

McChord AFB lies on a broad upland drift plain in the southern part of the Puget Sound Basin. The upland separates the main body of Puget Sound on the west from a complex of glaciation that ended about 12,000 years ago. The thickness of unlithified Pleistocene sediments beneath the Puget Sound Basin is generally in excess of 1,000 feet and reaches approximately 2,000 feet in the vicinity of McChord AFB. The low relief surface slopes

gently westward with maximum elevations decreasing from 700 feet on the east to 300 feet on the west. The central and western portions of the upland are characterized by an extensive series of broad glacial meltwater channels cut above 100 feet into the general upland surface and mantled by a thin veneer of latest outwash gravel (Steilacoom gravel) deposited in braided channels as melting of ice from the upland permitted rapid discharge of glacial Lake Puyallup, on the east, across the upland surface toward the depression of Puget Sound. The gravel in these channels contains extensive, shallow, unconfined aquifers and is manifest in a number of large lakes and peat-filled former lakes (USAF 2000c).

Base elevation generally ranges from 280 feet to 320 feet MSL, while the average elevation is approximately 300 feet MSL. The highest elevations are found in Westcott and Porter Hills (360 feet MSL). Depressions (glacial kettles) as low as 263 feet MSL are found at Milburn Marsh (USAF 2000c).

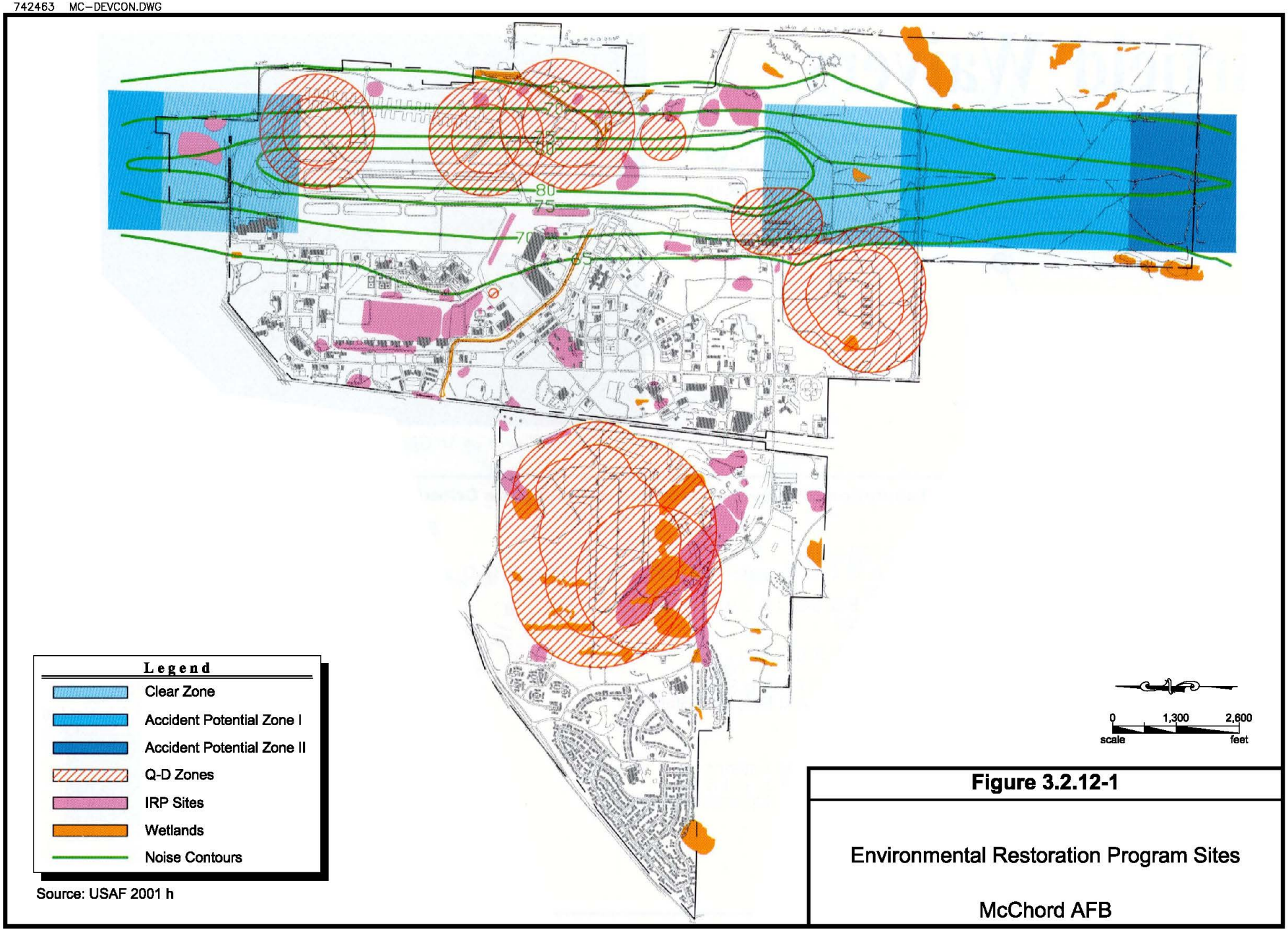
3.2.12.5 Soils

Soils on McChord AFB consist mainly of glacial outwash, with Spanaway gravelly sandy loam the most common soil type. This soil type is characterized by low moisture supplying capacity during the growing season, shallow root penetration potential and low soil fertility. Other soils found on the Base include Dupont muck and Everett gravelly sandy loam. The Spanaway, Fitch, and Everett soils are found in forested areas. Mukilteo and Semiahmoo muck and peat soils are found in depressional areas and wetlands. The normal soil pH is 6.0 with a range from 5.5 to 6.5. There are random, scattered peat deposits where pH values in a low (acid) range may be found (USAF 2000c).

The high permeability of near-surface sediments at the Base allows contaminants to migrate through the subsurface. As a result, certain contaminants that enter the subsurface may migrate relatively rapidly into groundwater supplies degrading water quality (USAF 1998b).

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Source: USAF 2001 h

Figure 3.2.12-1

Environmental Restoration Program Sites

McChord AFB

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter provides the scientific and analytic basis for the environmental consequences of the No Action Alternative, Proposed Action, and Alternative Action.

4.1 NO ACTION ALTERNATIVE, TRAVIS AFB

4.1.1 Introduction

There would be no change to the Travis AFB primary mission of providing rapid global mobility: the airlift and air refueling assets needed to deliver military aircraft, people and equipment wherever and whenever needed. The 60 and 349 Air Mobility Wings would continue to fly worldwide airlift missions and conduct training for all C-5 and KC-10 aircrew positions to ensure crews are current in airlift and air refueling procedures.

4.1.2 Air Quality

Emissions would continue to be generated by Base activities such as aircraft operations and other aircraft maintenance activities, as well as vehicle, boiler, generator, and fueling operations, and industrial processes. It is anticipated the emissions from these activities would continue at the levels generated under the baseline condition.

4.1.3 Noise

There would be no change in the number of assigned C-5 and KC-10 aircraft. The primary source of noise would be from aircraft operations which would be expected to continue at the current level of activity. The number of persons exposed to noise would remain at the current levels.

4.1.4 Hazardous Wastes, Hazardous Materials, and Stored Fuels

The mission of Travis AFB would not change. Thus, the Base would continue to accomplish the activities that occur under the current condition. The existing processes and procedures, which accommodate current activities, would continue to be used to manage hazardous wastes, hazardous materials, and stored fuels. It is also anticipated that the volumes of the materials used, generated, and stored would remain at current levels.

4.1.5 Water Resources

None of the facilities actions associated with C-17 basing would occur. Base development activities and routine facilities actions at Travis AFB would be accomplished in accordance with the Base's General Plan. The existing Storm Water Pollution Prevention Plan (SWPPP) would be used to comply with directives to ensure water quality is not degraded at Travis AFB.

4.1.6 Biological Resources

No facilities actions associated with C-17 basing would be accomplished at Travis AFB under the No Action Alternative. The potential for adverse effects to biological resources on Travis AFB would be minimized through the use of existing natural resources management plans. The potential for bird-aircraft strikes at Travis AFB would remain at current levels.

4.1.7 Socioeconomic Resources

No facilities actions associated with C-17 basing would be accomplished at Travis AFB under the No Action Alternative. Although there could be minor variations in the number of personnel authorizations at the Base, no large-scale changes such as those associated with unit changes would occur. The economic influence of the Base on the local communities and governmental agencies would continue at the levels experienced under the existing conditions.

4.1.8 Cultural Resources

No facilities actions associated with C-17 basing would be accomplished at Travis AFB under the No Action Alternative. However, facilities construction typical of that in previous years likely would occur as part of the Base's overall facilities modernization plan. Cultural resources would continue to be managed under existing regulations and the Base's ICRMP. Travis AFB would not cause adverse effects to cultural resources along the MTRs since the Base's mission would not require its aircrews to accomplish low-level navigation training.

4.1.9 Land Use

None of the facilities actions associated with C-17 basing would occur. Routine facilities actions at Travis AFB would be accomplished in accordance with the Base's General Plan.

4.1.10 Infrastructure and Utilities

No facilities actions associated with C-17 basing would be accomplished at Travis AFB under the No Action Alternative. Although there could be minor variations in the number of personnel authorizations at the Base, no large-scale changes such as those associated with unit changes would occur. For these reasons, water consumption, as well as wastewater and solid waste generation, would continue at the levels experienced under the current conditions. The volume of vehicular traffic would remain at current levels due to no significant change in assigned personnel.

4.1.11 Airspace and Airfield Operations

No C-17 aircraft would be located at Travis AFB, and no C-5s would be transferred from the Base, under the No Action Alternative. The types of aircraft operating at the Base, as well as airspace and runway use, would remain the same as the baseline. The air traffic

control procedures, which accommodate the current level of activity, would continue to be used to control aircraft operations.

4.1.12 Environmental Management

The mission of Travis AFB would not change under the No Action Alternative. Thus, the Base would continue to accomplish the activities that occur under the current condition. The existing processes and procedures, which accommodate current activities, would continue to be used to manage pollution prevention, asbestos and lead-based paint (LBP), and the ERP, as well as geologic and soils features.

4.2 NO ACTION ALTERNATIVE, MCCHORD AFB

4.2.1 Introduction

There would be no change to the McChord AFB primary mission of providing airlift of troops, equipment, and passengers. The 62 and 446 AWs would continue to fly worldwide airlift missions and conduct training for all C-17 aircrew positions to ensure crews are current in airlift, air refueling, and airdrop procedures.

4.2.2 Air Quality

Emissions would continue to be generated by Base activities such as aircraft operations and other aircraft maintenance activities, as well as vehicle, boiler, generator, and fueling operations, and industrial processes. It is anticipated the emissions from these activities would continue at the levels generated under the baseline condition.

4.2.3 Noise

McChord AFB would accomplish it mission with 48 C-17 aircraft. The primary source of noise would be from aircraft operations which would be expected to continue at the current level of activity. The number of persons exposed to noise would remain at the current levels

4.2.4 Hazardous Wastes, Hazardous Materials, and Stored Fuels

The mission of McChord AFB would not change under the No Action Alternative. Thus, the Base would continue to accomplish the activities that occur under the current condition. The existing processes and procedures, which accommodate current activities, would continue to be used to manage hazardous wastes, hazardous materials, and stored fuels. It is also anticipated that the volumes of the materials used, generated, and stored would remain current levels.

4.2.5 Water Resources

None of the facilities actions associated with basing 12 additional C-17 aircraft would occur. The existing SWPPP would be used to comply with directives to ensure water quality is not degraded at McChord AFB.

4.2.6 Biological Resources

No facilities actions associated with C-17 basing would be accomplished at McChord AFB under the No Action Alternative. The potential for adverse effects to biological resources on McChord AFB would be minimized through the use of existing natural resources management plans. The potential for bird-aircraft strikes at McChord AFB and on the MTRs would remain at current levels.

4.2.7 Socioeconomic Resources

No facilities actions associated basing 12 additional C-17 aircraft at McChord AFB would be accomplished under the No Action Alternative. Although there could be minor variations in the number of personnel authorizations at the Base, no large-scale changes such as those associated with unit changes would occur. The economic influence of the Base on the local communities and governmental agencies would continue at the levels experienced under the existing conditions.

4.2.8 Cultural Resources

No facilities actions associated with C-17 basing would be accomplished at McChord AFB under the No Action Alternative. Cultural resources would continue to be managed under existing regulations and the Base's CRMP. The potential for adverse effects to cultural resources along the MTRs would continue to be minimized through the Base's interaction with the Native American tribes associated with the routes.

4.2.9 Land Use

None of the facilities actions associated basing 12 additional C-17 aircraft would occur. The level of operations on the MTRs would remain at baseline levels.

4.2.10 Infrastructure and Utilities

No facilities actions associated with basing 12 additional C-17 aircraft would occur under the No Action Alternative. Although there could be minor variations in the number of personnel authorizations at the Base, no large-scale changes such as those associated with unit changes would occur. For these reasons, water consumption, as well as wastewater and solid waste generation, would continue at the levels experienced under the current conditions. The volume of vehicular traffic would remain at current levels due to no significant change in assigned personnel.

4.2.11 Airspace and Airfield Operations

McChord AFB would operate 48 C-17 aircraft under the No Action Alternative. The types of aircraft operating at the Base, as well as airspace, runway, and MTR use, would remain the same as the baseline. The air traffic control procedures, which accommodate the current levels of activity, would continue to be used to control aircraft operations at the Base and on the MTRs.

4.2.12 Environmental Management

The mission of McChord AFB would not change under the No Action Alternative. Thus, the Base would continue to accomplish the activities that occur under the current condition. The existing processes and procedures, which accommodate current activities, would continue to be used to manage pollution prevention, asbestos and LBP, and the ERP, as well as geologic and soils features.

4.3 PROPOSED ACTION, TRAVIS AFB

4.3.1 Introduction

Basing 12 C-17 aircraft at Travis AFB and transferring 16 C-5 aircraft to an ARC installation would enhance the capability of the Air Force to meet the national military strategy by modernizing strategic and tactical airlift aircraft on the west coast. The Travis AFB mission of providing rapid global mobility through airlift and air refueling would be improved with the addition of C-17 aircraft.

4.3.2 Air Quality

Impacts to air quality in attainment areas would be considered significant if pollutant emissions associated with the implementation of the federal action caused or contributed to a violation of any national, state, or local ambient air quality standard, exposed sensitive receptors to substantially increased pollutant concentrations, represented an increase of ten percent or more in affected AQCR's emissions inventory, or exceeded any significance criteria established by the SIP. Impacts to air quality in nonattainment areas would be considered significant if the net change in proposed pollutant emissions caused or contributed to a violation of any national, state, or local ambient air quality standard; increased the frequency or severity of a violation of any ambient air quality standard; or delayed the attainment of any standard or other milestone contained in the SIP. With respect to the General Conformity Rule, impacts to air quality would be considered significant if emissions increased a nonattainment or maintenance area's emissions inventory by 10 percent or more for individual nonattainment pollutants; or exceeded *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or pollutants for which an area has been redesignated as a maintenance area.

Under the Proposed Action, 12 total C-17 aircraft would be based at Travis AFB and 16 C-5s would be transferred to another installation. Aircraft maintenance activities and airfield operations would be accomplished at Travis AFB. Operations and training flights would occur on the 19 MTRs in California, Nevada, and Oregon. Additionally, 16 facility construction projects would be accomplished at the Base.

4.3.2.1 Travis AFB

Fugitive dust from ground disturbing activities, combustive emissions from construction equipment, and emissions from asphalt paving operations would be generated during construction and demolition. Fugitive dust would be generated from activities

associated with site clearing, grading, cut and fill operations, and from vehicular traffic moving over the disturbed site. These emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. The USEPA has estimated that uncontrolled fugitive dust emissions from ground-disturbing activities would be emitted at a rate of 80 lbs of TSP per acre per day of disturbance (USEPA 1995). In a USEPA study of air sampling data at a distance of 50 meters downwind from construction activities, PM_{10} emissions from various open dust sources were determined based on the ratio of PM_{10} to TSP sampling data. The average PM_{10} to TSP ratios for top soil removal, aggregate hauling, and cut and fill operations is reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for PM_{10} dust emissions becomes 19.2 pounds per acre per day of disturbance. Fugitive dust emissions from demolition activities would be generated primarily from building dismemberment, debris loading, and debris hauling. The USEPA has established a recommended emission factor of 0.011 pounds of PM_{10} per square foot of demolished floor area. This emission factor is based on air sampling data taken from the demolition of a mix of commercial brick, concrete, and steel buildings (USEPA 1988).

The USEPA also assumes that 230 working days are available per year for construction (accounting for weekends, weather, and holidays), and that only half of these working days would result in uncontrolled fugitive dust emissions at the emitted rate described above (USEPA 1995). The construction emissions presented in Table 4.3.2-1 include the estimated annual PM_{10} and $PM_{2.5}$ emissions associated with the Proposed Action at Travis AFB. These emissions would produce slightly elevated short-term PM_{10} and $PM_{2.5}$ ambient air concentrations. The USEPA estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. Watering the disturbed area of the construction site twice per day with approximately 3,500 gallons per acre per day would reduce TSP emissions by as much as 50 percent (USEPA 1995).

Table 4.3.2-1 Proposed Action Emissions, Travis AFB

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	No_x (tpy)	So_x (tpy)	PM_{10} (tpy)
AQCR CY99Totalsa	1,096,825	202,210	236,520	32,120	82,125
Proposed Action					
Construction Emissions[b]	0.749	0.234	3.442	0.000	0.244
Construction Emissions as Percent of AQCR Emissions	0.000%	0.000%	0.001%	0.000%	0.000%
Aircraft Emissions					
AGE Operation[b]	118.520	6.077	2.204	0.024	0.157
Airfield Operations[b]	105.000	33.000	1,446.000	0.000	96.000
Aircraft Trim/Power Checks[b]	1.640	0.481	14.057	0.295	0.000
IR-203 Operations[b]	0.180	0.110	15.38	0.000	1.180

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	No_x (tpy)	So_x (tpy)	PM_{10} (tpy)
IR-207/208 Operations[b]	0.070	0.040	5.570	0.000	0.430
Annual Aircraft Emissions[b]	225.410	39.708	1,483.211	0.319	97.767
Aircraft Emissions as Percent of AQCR Emissions	0.0206%	0.0196%	0.6271%	0.0010%	0.1190%

A SFBAAB 2000 Emission Inventory

B USAF 2003h.

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. $PM_{2.5}$ is included for information only. Emissions listed for an MTR are those that would occur from operations on that portion of the MTR within the AQCR. Emissions for the remainder of the MTR are listed in Table 4.3.2-3.

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established cost estimating methodologies for construction and experience with similar types of construction projects (Means 1996). Combustive emissions from construction equipment exhausts were estimated by using USEPA approved emissions factors for heavy-duty diesel-powered construction equipment (USEPA 1985). The construction emissions presented in Table 4.3.2-1 include the estimated annual emissions from construction equipment exhaust associated with the Proposed Action at Travis AFB. As with fugitive dust emissions, combustion emissions would produce slightly elevated air pollutant concentrations. However, the effects would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-term impacts.

Emissions would also be expected from asphalt paving operations. The primary pollutant from asphalt paving is CO; however, minor emissions of other criteria pollutants can be expected. To determine potential emissions from asphalt paving operations, it was assumed that the unit weight of asphalt concrete is 149 pounds per cubic foot (lbs/ft^3). The quantity of asphalt concrete required for each construction project is based on an assumed pavement depth of 12 inches. The USEPA has established emission factors for CO, VOCs, SO_x, NO_x, and PM_{10} of 0.340, 0.017, 0.005, 0.025, 0.020 pounds of pollutant per ton of asphalt concrete, respectively. Expected emissions from asphalt paving are included under the construction emissions in the Table 4.3.2-1 data. Emissions from paving would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Aerospace ground equipment (AGE), airfield, and MTR operations, as well as aircraft trim/power checks, would generate emissions on a recurring basis. Table 4.3.2-1 lists the annual emissions from these operations for the Proposed Action condition of 12 C-17 and 21 C-5 aircraft at Travis AFB. Table 4.3.2-2 shows the net change in emissions from aircraft operations-related activities at Travis AFB when compared to the baseline condition. Emissions for airfield and MTR operations were determined using Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations, IERA-RS-BR-SR-2001-0001, July 2001. Emissions from AGE and aircraft trim/power checks were determined by using the Emissions and Dispersion Modeling System (EDMS), an emissions/dispersion model jointly developed by the Air Force and the FAA. The EDMS is also approved by the USEPA.

Table 4.3.2-2 Net Change in Emissions from Aircraft Operations Activities, Proposed Action, Travis AFB

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Baseline Emissions	222.764	48.660	1,825.742	0.344	79.101
Annual Aircraft Operations Activities Emissions	225.410	39.708	1,483.211	0.319	97.767
Net Change in Aircraft Operations Activities Emissions	+2.646	-8.952	-342.531	-0.025	+18.666
Net Change as Percent of Baseline	+1.1878%	-18.3970%	-18.7612%	-7.2674%	+23.5977%

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. Data reflected as tpy.

Review of data in Table 4.3.2-1 indicates that the greatest increase in emissions from Proposed Action activities would be NO_x (1,483.211 tpy), which equates to 0.6271 percent of the NO_x emissions within the AQCR.

Based on the requirements outlined in the USEPA's General Conformity Rule published in 58 Federal Register 63214 (November 30, 1993) and codified in 40 CFR Part 93, Subpart B (for federal agencies), a conformity analysis is required to analyze whether the applicable criteria air pollutant emissions associated with the project equal or exceed the threshold emission limits (*i.e., de minimis*) that trigger the need to conduct a formal conformity determination. The intent of the conformity rule is to encourage long range planning by evaluating the air quality impacts from federal actions before the projects are undertaken. This rule establishes a process for analyzing and determining whether a proposed project in a nonattainment area conforms to the SIP and federal standards. A federal action would be considered regionally significant when the total emissions from the proposed action equal or exceed 10 percent of the nonattainment or maintenance area's emissions inventory for any criteria air pollutant. A full conformity determination is not required if a federal action meets *de minimis* requirements and is *not* considered a regionally significant action. Ongoing activities currently being conducted are exempt from the rule so long as there is no increase in emissions equal to or greater than above the *de minimis* levels as the result of the federal action.

A CAA General Conformity Applicability Analysis for Travis AFB was prepared in June 2003 for the Proposed Action (USAF 2003h). Based on the emissions calculations, the analysis concluded that, although the Proposed Action would occur within an air basin designated as moderate nonattainment for O_3, the net change in emissions for O_3 as well as the other criteria pollutants would be less than 10 percent of the emissions inventory and the action would not be considered regionally significant. Additionally, the net change in emissions would not exceed the *de minimis* thresholds. The analysis determined that the Proposed Action positively conforms to the applicable SIP for the SFBAAB. The Proposed Action has been demonstrated by USEPA standards not to cause or contribute to new violations of any NAAQS in the affected area, nor increase the frequency or severity of an existing violation. Implementation of the Proposed Action would not delay timely attainment

of the O_3 standards in the air basin, and the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP. This conclusion of positive general Conformity determination for the federal action planned for Travis AFB fulfilled the Air Force's obligation and responsibility under 40 CFR Part 93, Subpart B.

The USEPA has promulgated new NAAQS for fine particulates less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$). The CY 2000 SFBAAB emissions inventory is the most recent and complete inventory made available to the public. This inventory, however, was completed prior to enforcement of the $PM_{2.5}$ NAAQS, and therefore are not included in the emissions summaries. For this reason, it was assumed in this EA that $PM_{2.5}$ emissions would be the same as the PM_{10} emissions for all analyses.

In summary, emissions from the construction activities would be temporary and would be eliminated when the activities are completed, and would not be regionally significant. Emissions from aircraft, AGE, and MTR operations, as well as aircraft trim/power checks, would not exceed *de minimis* thresholds, nor would they be considered regionally significant. A Conformity Determination would not be required.

4.3.2.2 Military Training Routes

Travis AFB C-17 aircrews would accomplish operations on MTRs in California, Nevada, and Oregon. Table 4.3.2-3 lists the estimated emissions for C-17 operations on the Proposed Action MTRs within the respective AQCR or air basin and compares the emissions to the AQCR or basin emission inventory. As indicated in the table, many MTRs occur in more than one AQCR due to the length and locations of the routes. Portions of the MTRs that occur within the SFBAAB are included in the analyses for Travis AFB.

Table 4.3.2-3 Proposed Action Emissions, Military Training Routes

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	Nox (tpy)	Sox (tpy)	PM_{10} (tpy)
Mountain Counties Air Basin, CA					
CY01Totals[a]	252,982	20,666	35,525	1,310	45,687
VR-202	0.05	0.03	4.26	0.00	0.33
VR-1250/1252	0.01	0.01	1.07	0.00	0.08
SR-311/359	0.20	0.11	16.41	0.00	1.26
IR-203	0.09	0.05	7.81	0.00	0.60
IR-207/208	0.04	0.02	3.42	0.00	0.26
Total MTR Operations[b]	0.39	0.22	32.97	0.00	2.53
MTR Emissions as Percent of AQCR Emissions	0.0002%	0.0011%	0.0928%	0.0000%	0.0055%
Sacramento Valley Air Basin, CA					
CY01Totals[a]	588,318	99,317	95,393	4,833	97,013
VR-202	0.08	0.04	6.39	0.00	0.49
VR-1250/1252	0.02	0.01	1.92	0.00	0.15
SR-300/301	0.20	0.11	16.28	0.00	1.25
IR-207/208	0.08	0.04	6.35	0.00	0.49
Total MTR Operations[b]	0.38	0.20	30.94	0.00	2.38
MTR Emissions as Percent of AQCR Emissions	0.0001%	0.0002%	0.0324%	0.0000%	0.0025%
Great Basin Valley Air Basin, CA					
CY01Totals[a]	25,561	2,201	4,581	314	314,710

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	Nox (tpy)	Sox (tpy)	PM_{10} (tpy)
VR-201	0.01	0.00	0.64	0.00	0.05
VR-208	0.02	0.01	1.60	0.00	0.12
VR-1205	0.19	0.11	15.45	0.00	1.19
SR-311/359	0.02	0.01	1.82	0.00	0.14
SR-381	0.01	0.00	0.52	0.00	0.04
SR-300/301	0.05	0.03	3.91	0.00	0.30
IR-236	0.07	0.04	5.47	0.00	0.42
Total MTR Operations[b]	0.37	0.20	29.41	0.00	2.26
MTR Emissions as Percent of AQCR Emissions	0.0014%	0.0091%	0.6420%	0.0000%	0.0007%
Lake County Air Basin, CA					
CY01Totals[a]	38,318	3,110	4,997	245	5,537
IR-207/208	0.02	0.01	1.95	0.00	0.15
Total MTR Operations[b]	0.02	0.01	1.95	0.00	0.15
MTR Emissions as Percent of AQCR Emissions	0.0001%	0.0032%	0.0390%	0.0000%	0.0027%
Northeast Plateau Air Basin, CA					
CY01Totals[a]	148,478	8,964	14,184	613	31,361
VR-202	0.01	0.01	1.07	0.00	0.08
VR-1250/1252	0.04	0.02	3.41	0.00	0.26
VR-1254	0.04	0.02	2.98	0.00	0.23
SR-300/301	0.12	0.07	10.42	0.00	0.80
IR-207/208	0.06	0.03	4.88	0.00	0.38
Total MTR Operations[b]	0.27	0.15	22.76	0.00	1.75
MTR Emissions as Percent of AQCR Emissions	0.0002%	0.0017%	0.1605%	0.0000%	0.0056%
North Coast Air Basin, CA					
CY01Totals[a]	190,209	20,407	22,849	1,219	30,788
VR-202	0.06	0.04	5.33	0.00	0.41
VR-1250/1252	0.03	0.02	2.77	0.00	0.21
Total MTR Operations[b]	0.09	0.06	8.10	0.00	0.62
MTR Emissions as Percent of AQCR Emissions	0.0000%	0.0003%	0.0355%	0.0000%	0.0020%
North Central Coast Air Basin, CA					
CY01Totals[a]	188,858	31,861	28,707	1,475	27,923
VR-249	0.04	0.02	3.20	0.00	0.25
IR-203	0.07	0.04	5.86	0.00	0.45
IR-207/208	0.04	0.02	2.93	0.00	0.23
Total MTR Operations[b]	0.15	0.08	11.99	0.00	0.93
MTR Emissions as Percent of AQCR Emissions	0.0001%	0.0003%	0.0418%	0.0000%	0.0033%
San Joaquin Valley Air Basin, CA					
CY01Totals[a]	812,862	200,279	172,904	16,673	172,842
SR-311/359	0.01	0.00	0.46	0.00	0.04
IR-203	0.11	0.06	9.28	0.00	0.71
IR-236	0.01	0.00	0.63	0.00	0.05
Total MTR Operations[b]	0.13	0.06	10.37	0.00	0.80
MTR Emissions as Percent of AQCR Emissions	0.0000%	0.0000%	0.0060%	0.0000%	0.0005%
South Central Coast Air Basin, CA					
CY01Totals[a]	266,976	45,359	56,433	6,745	31,857
VR-249	0.06	0.03	4.79	0.00	0.37
IR-203	0.08	0.04	6.35	0.00	0.49
Total MTR Operations[b]	0.14	0.07	11.14	0.00	0.86

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	Nox (tpy)	Sox (tpy)	PM_{10} (tpy)
MTR Emissions as Percent of AQCR Emissions	0.0001%	0.0002%	0.0197%	0.0000%	0.0027%
Churchill County, NV					
CY99Totals[c]	13,989	2,716	2,161	120	426
VR-201	0.01	0.00	0.43	0.00	0.03
VR-208	0.01	0.00	0.43	0.00	0.03
VR-1250/1252	0.04	0.02	3.41	0.00	0.26
VR-1254	0.00	0.00	0.21	0.00	0.02
SR-381	0.03	0.02	2.34	0.00	0.18
IR-207/208	0.04	0.02	2.93	0.00	0.23
Total MTR Operations[b]	0.13	0.06	9.75	0.00	0.75
MTR Emissions as Percent of AQCR Emissions	0.0009%	0.0022%	0.4512%	0.0000%	0.1761%
Douglas County, NV					
CY99Totals[c]	16,250	2,997	1,792	115	341
SR-381	0.01	0.00	0.52	0.00	0.04
Total MTR Operations[b]	0.01	0.00	0.52	0.00	0.04
MTR Emissions as Percent of AQCR Emissions	0.0001%	0.0000%	0.0290%	0.0000%	0.1173%
Esmeralda County, NV					
CY99Totals[c]	2,658	725	106	28	502
VR-1205	0.03	0.01	2.13	0.00	0.16
VR-1250/1252	0.03	0.02	2.77	0.00	0.21
VR-208	0.03	0.01	2.13	0.00	0.16
Total MTR Operations[b]	0.09	0.04	7.03	0.00	0.53
MTR Emissions as Percent of AQCR Emissions	0.0339%	0.0055%	6.6321%	0.0000%	0.1056%
Humboldt County, NV					
CY99Totals[c]	8,268	10,421	820	6,859	680
SR-300/301	0.15	0.09	12.37	0.00	0.95
Total MTR Operations[b]	0.15	0.09	12.37	0.00	0.95
MTR Emissions as Percent of AQCR Emissions	0.0018%	0.0086%	1.5085%	0.0000%	0.1397%
Lander County, NV					
CY99Totals[c]	4,205	788	841	49	279
VR-208	0.02	0.01	1.70	0.00	0.13
VR-1250/1252	0.00	0.00	0.21	0.00	0.02
SR-300/301	0.17	0.10	14.32	0.00	1.10
Total MTR Operations[b]	0.19	0.11	16.23	0.00	1.25
MTR Emissions as Percent of AQCR Emissions	0.0045%	0.0140%	1.9298%	0.0000%	0.4480%
Lyon County, NV					
CY99Totals[c]	14,765	8,604	1,933	528	2,550
VR-201	0.01	0.01	1.07	0.00	0.08
SR-300/301	0.04	0.02	3.26	0.00	0.25
SR-381	0.01	0.01	1.04	0.00	0.08
Total MTR Operations[b]	0.06	0.04	5.37	0.00	0.41
MTR Emissions as Percent of AQCR Emissions	0.0041%	0.0046%	0.2778%	0.0000%	0.0161%
Mineral County, NV					
CY99Totals[c]	4,211	788	841	445	378
VR-201	0.02	0.01	1.49	0.00	0.11
VR-1250/1252	0.01	0.00	0.64	0.00	0.05
SR-300/301	0.12	0.07	9.77	0.00	0.75
Total MTR Operations[b]	0.15	0.08	11.90	0.00	0.91

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	Nox (tpy)	Sox (tpy)	PM_{10} (tpy)
MTR Emissions as Percent of AQCR Emissions	0.0036%	0.0102%	1.4150%	0.0000%	0.2407%
Nye County, NV					
CY99Totals[c]	15,427	3,084	2,159	646	3,948
VR-208	0.02	0.01	1.70	0.00	0.13
VR-1250/1252	0.02	0.01	1.49	0.00	0.11
SR-300/301	0.08	0.05	6.51	0.00	0.50
Total MTR Operations[b]	0.12	0.07	9.70	0.00	0.74
MTR Emissions as Percent of AQCR Emissions	0.0008%	0.0023%	0.4493%	0.0000%	0.0187%
Pershing County, NV					
CY99Totals[c]	4,207	926	844	50	97
VR-1254	0.01	0.00	0.64	0.00	0.05
SR-300/301	0.13	0.08	11.07	0.00	0.85
IR-207/208	0.01	0.01	0.98	0.00	0.08
Total MTR Operations[b]	0.15	0.09	12.69	0.00	0.98
MTR Emissions as Percent of AQCR Emissions	0.0036%	0.0097	1.5036%	0.0000%	1.0103%
Storey County, NV					
CY99Totals[c]	4,386	2,928	255	27	29
VR-1250/1252	0.02	0.01	1.28	0.00	0.10
Total MTR Operations[b]	0.02	0.01	1.28	0.00	0.10
MTR Emissions as Percent of AQCR Emissions	0.0005%	0.0034%	0.5020%	0.0000%	0.3448%
Washoe County, NV					
CY99Totals[c]	71,847	8,305	17,548	1,037	859
VR-202	0.04	0.02	3.20	0.00	0.25
VR-1254	0.02	0.01	1.92	0.00	0.15
SR-300/301	0.02	0.01	1.95	0.00	0.15
IR-207/208	0.05	0.03	3.91	0.00	0.30
Total MTR Operations[b]	0.13	0.07	10.98	0.00	0.85
MTR Emissions as Percent of AQCR Emissions	0.0002%	0.0008%	0.0626%	0.0000%	0.0990%
AQCR 190, OR					
CY99Totals[c]	4,251	1,154	1,280	629	2,162
SR-300/301	0.07	0.04	5.86	0.00	0.45
Total MTR Operations[b]	0.07	0.04	5.86	0.00	0.45
MTR Emissions as Percent of AQCR Emissions	0.0016%	0.0035%	0.4578%	0.0000%	0.0208%

a See Table 3.1.2-4.
b Estimated emissions from Proposed Action activities.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment. Data are reflected as tpy. The emissions inventories for the counties in Nevada do not include emissions from mobile sources, only stationary sources. To ensure a more accurate comparison, the mobile emissions from California counties with similar populations and geographical settings were added to the Nevada counties emissions.

As indicated on Table 3.1.2-4, the Sacramento Valley, Great Basin, Lake County, San Joaquin Valley, and South Central Coast Air Basins in California, as well as Douglas and Washoe Counties in Nevada, are nonattainment. Based on emissions calculations summarized in Table 4.3.2-3, the net change in emissions for any of the criteria pollutants in any of these four air basins and two counties would be less than 10 percent of the particular

emissions inventory and the action would not be considered regionally significant. The Proposed Action has been demonstrated by USEPA standards not to cause or contribute to new violations of any NAAQS in the affected area, nor increase the frequency or severity of an existing violation. Implementation of the Proposed Action would not delay timely attainment of the air quality standards in the air basin, and the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP.

Review of data in Table 4.3.2-3 for the Mountain Counties, Northeast Plateau, North Coast, and North Central Coast Air Basins, Esmerelda, Humboldt, Lander, Lyon, Mineral, Nye, Pershing, and Storey Counties in Nevada, and AQCR 190, all of which are in attainment, indicates that the greatest increase in emissions from MTR operations would be NO_x (32.97 tpy) from recurring aircraft operations in the Mountain Counties Air Basin, which equates to 0.0928 percent of the NO_x emissions within the air basin. Emissions in each of these air basins fall below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852. However, the Mountain Counties, Northeast Plateau, North Coast, and North Central Coast Air Basins, the eight Nevada counties, and AQCR 190 are in attainment. Therefore, the air emission impacts from the activities associated with the Proposed Action in these air basins and AQCR would not be considered significant and a Conformity Determination would not be required.

4.3.2.3 Mitigation

No significant air quality impacts would be anticipated. Therefore, no mitigation would be required.

4.3.2.4 Cumulative Impacts

Numerous construction projects would occur under other actions announced for Travis AFB. Additionally, Coast Guard C-130 aircraft would use the airfield. The methodologies for calculating emissions for the Proposed Action were used to estimate emissions for the cumulative condition at the Base. Table 4.3.2-4 summarizes the emissions from the other actions as well as the Proposed Action and compares the emissions with the baseline AQCR emissions inventory. Table 4.3.2-5 shows the net change in emissions from cumulative condition aircraft operations-related activities at Travis AFB when compared to the baseline.

Table 4.3.2-4 Cumulative Condition Emissions, Travis AFB

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)
AQCR CY99 Totals[a]	1,096,825	202,210	236,520	32,120	82,125
Construction Emissions					
Other Action Emissions[b]	0.700	0.219	3.219	0.000	0.228
Proposed Action Emissions[b]	0.749	0.234	3.442	0.000	0.244
Total Construction Emissions	1.449	0.453	6.661	0.000	0.472
Construction Emissions as Percent of AQCR Emissions	0.000%	0.000%	0.003%	0.000%	0.001%

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)
Aircraft Emissions					
Other Action	25.950	2.866	11.662	0.703	0.056
Proposed Action[b]	225.410	39.708	1,483.211	0.319	97.767
Total Aircraft Emissions	251.360	42.574	1,494.873	1.022	97.823
Aircraft Emissions as Percent of AQCR Emissions	0.0229%	0.0211%	0.6320%	0.0032%	0.1191%

a SFAAB 2000 Emission Inventory.
b USAF 2003h.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant.

Table 4.3.2-5 Net Change in Emissions from Aircraft Operations Activities, Cumulative Condition, Travis AFB

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Baseline Emissions	222.764	48.660	1,825.742	0.344	79.101
Annual Other Action Aircraft Operations Emissions	25.950	2.866	11.662	0.703	0.056
Annual Proposed Action Aircraft Operations Activities Emissions	225.410	39.708	1,483.211	0.319	97.767
Combined Annual Aircraft Operations Emissions	251.360	42.574	1,494.873	1.022	97.823
Net Change in Aircraft Operations Activities Emissions	+28.596	-12.507	-330.869	+0.678	+18.722
Net Change as Percent of Baseline	+12.8369%	-12.5072%	-18.1224%	+197.0930%	+23.6685%

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. Data are reflected as tpy.

Review of data in Table 4.3.2-4 indicates that the greatest increase in emissions from Proposed Action cumulative condition activities would be NO_x (1,494.873 tpy), which equates to 0.6320 percent of the NO_x emissions within the AQCR.

The CAA General Conformity Applicability Analysis prepared for the Proposed Action at Travis AFB also included emissions from other actions. Based on the emissions calculations summarized in Table 4.3.2-4, the analysis concluded that, although the Proposed Action cumulative condition would occur within an air basin designated as moderate nonattainment for O_3, the net increase in emissions for O_3 as well as the other criteria pollutants would be less than 10 percent of the emissions inventory and the action would not be considered regionally significant. Additionally, the net change in emissions would not exceed the *de minimis* thresholds. The analysis determined that the Proposed Action cumulative condition positively conforms to the applicable SIP for the SFBAAB. The Proposed Action cumulative condition has been demonstrated by USEPA standards not to cause or contribute to new violations of any national ambient air quality standard in the

affected area, nor increase the frequency or severity of an existing violation. The Proposed Action cumulative condition would not delay timely attainment of the O_3 standards in the air basin, and the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP. This conclusion of positive general Conformity Determination for the federal action planned for Travis AFB fulfilled the Air Force's obligation and responsibility under 40 CFR Part 93, Subpart B.

In summary, emissions from the construction activities would be temporary and would be eliminated when the activities are completed, and would not be regionally significant. Emissions from aircraft, AGE, and MTR operations, as well as aircraft trim/power checks, would not exceed *de minimis* thresholds, nor would they be considered regionally significant. A Conformity Determination would not be required.

4.3.3 Noise

One of the principal environmental concerns resulting from airfield operations is noise. There are several characteristics of noise, including loudness (amplitude), sharpness or pitch (sound-wave frequency), and the length of time over which the noise is transmitted to a receptor (duration). The noise most often experienced as a result of airfield operations is generally moderately loud, high-pitched, and lasting for up to several minutes per event (*e.g.*, takeoffs, landings, and flyovers). The overall level of noise perceived by an individual depends on distance from the source. The noise figures in this EA illustrate the calculated noise contours for the airfield and the surrounding areas. These contours consider loudness, pitch, duration, flight track profiles, and distance for the various aircraft operations generated during a 24-hour day. These noises are calculated in terms of SEL dBA for single event analysis and CNEL dBA or DNL dBA for cumulative noise impact analysis.

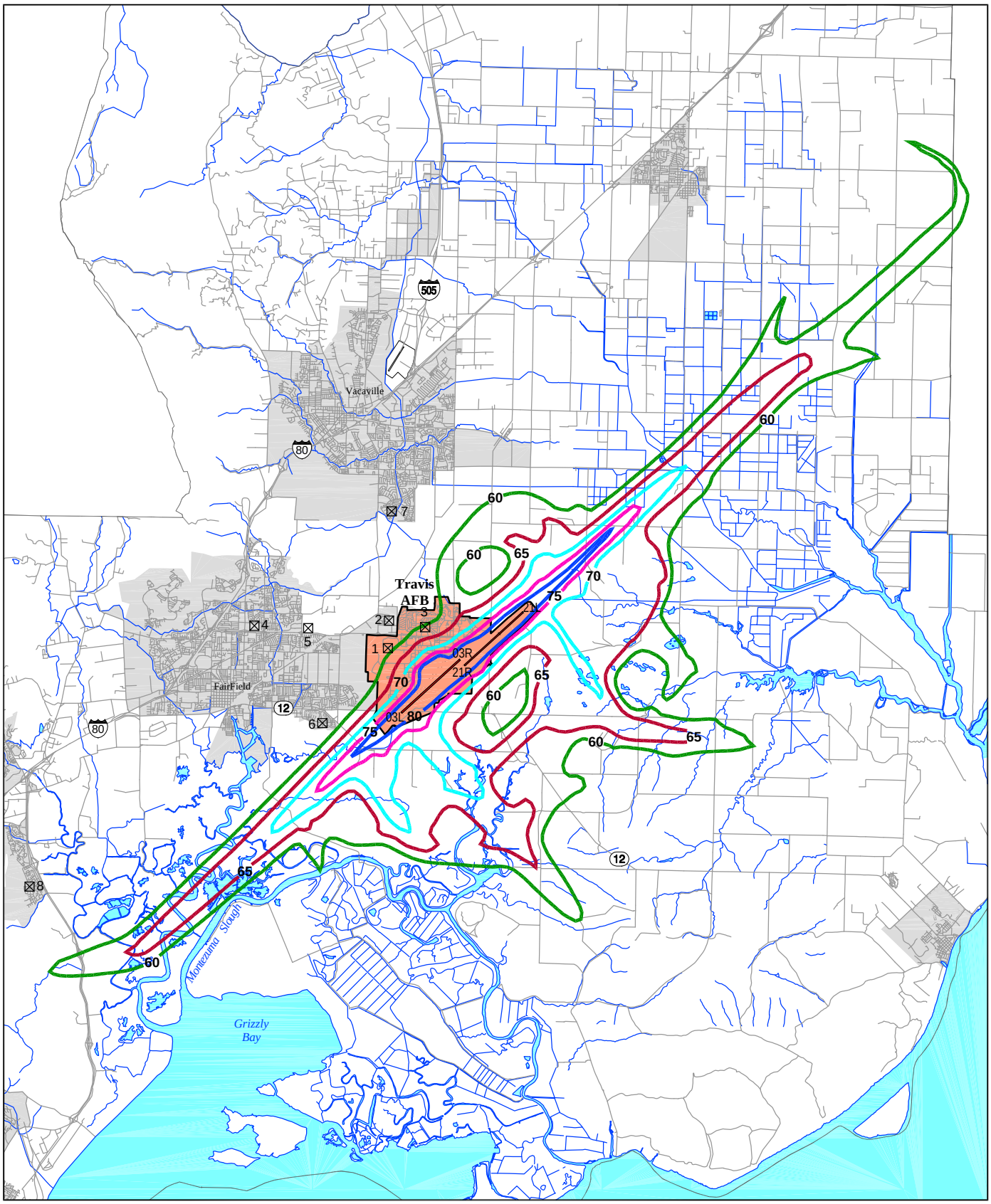
Several items were examined in evaluating potential noise impacts, including (1) the degree to which noise levels generated by construction and airfield operation activities were different than the baseline noise levels, (2) the degree to which there may be annoyance and/or activity interference, and (3) the areas where noise-sensitive receptors might be exposed to noise above CNEL or DNL 65 dBA.

4.3.3.1 Travis AFB

Figure 4.3.3-1 depicts the noise exposure area from the aircraft operations condition at the Base after the 12 C-17 would be based at Travis AFB and the 16 C-5 aircraft are relocated to another installation, leaving 21 C-5s at the Base. The aircraft operations modeled include the KC-10 and other aircraft operations from the baseline condition as well as the anticipated C-17 and C-5 operations. Figure 4.3.3-2 compares the Proposed Action and baseline noise contours. There would be no change to the baseline condition aircraft ground tracks under the Proposed Action at Travis AFB (see Figure 3.1.3-3).

Table 4.3.3-1 compares the baseline Proposed Action CNEL and presents the C-17 SEL at the specific data points. Table 4.3.3-2 compares the on-Base land area and population exposed to noise of CNEL 60 dBA and greater, as well as the population potentially highly annoyed, for the Proposed Action with the baseline condition, while Table 4.3.3-3 presents the

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Travis Air Force Base

LEGEND

- CNEL 60 dBA Contour
- CNEL 65 dBA Contour
- CNEL 70 dBA Contour
- CNEL 75 dBA Contour
- CNEL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- Travis AFB

19,000 0 19,000
Feet

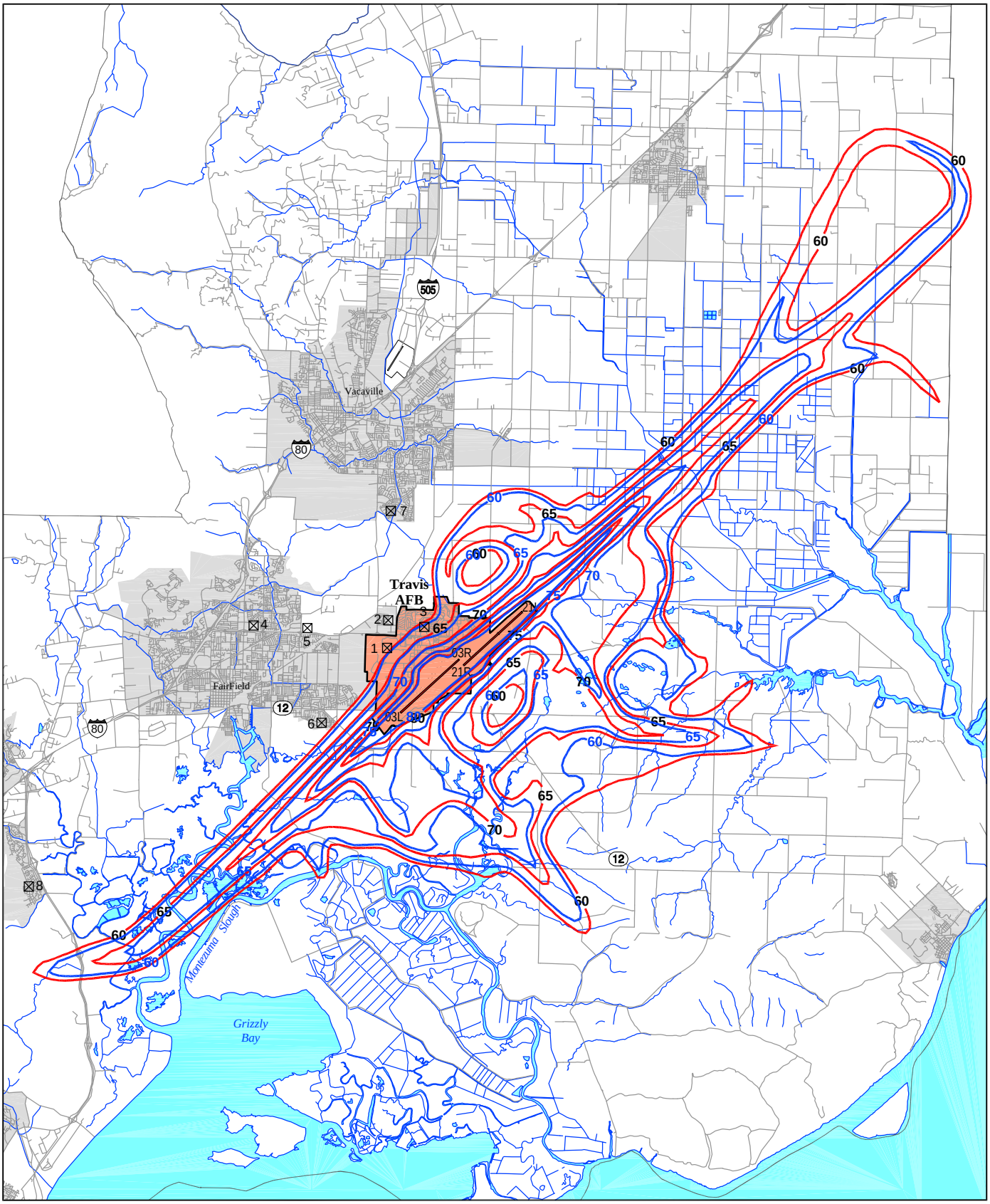
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Proposed Action Noise Contours Travis AFB

Figure 4.3.3-1

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Travis Air Force Base

LEGEND

- Baseline Noise Contours
- Proposed Action Noise Contours
- Runway
- Roadway
- Analysis Point
- Travis AFB

19,000 0 19,000

Feet

N

Comparison of Baseline and Proposed Action Noise Contours Travis AFB

Figure 4.3.3-2

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same comparison for the off-Base area. There would be an overall 15 percent decrease in the number of people exposed to CNEL 60 dBA and greater. Data from these tables are used in the single event and day-night sound analysis sections.

Table 4.3.3-1 Comparison of SEL and CNEL from Proposed Airfield Operations at Specific Analysis Points with Baseline, Proposed Action, Travis AFB

		CNEL (dBA)		
Number	**Description**	**BL**	**PA**	**Chg**
1	Base Hospital	59	59	0
2	Schools	54	53	-1
3	Base Housing	62	61	-1
4	Fairfield High School	49	47	-2
5	School	49	48	-1
6	Residential Area	56	55	-1
7	Residential Area	52	51	-1
8	Residential Area	54	53	-1

Note: BL=baseline. PA=Proposed Action. Chg=change. There would be no change to the SEL (see Table 3.1.3-2) since there are no changes in the types of aircraft that operate at the Base or to the flight tracks or profiles these aircraft would fly. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the CNEL for a point from the table to the CNEL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

Table 4.3.3-2 Summary of On-Base Land Area and Population Exposed to, and Population Potentially Highly Annoyed by CNEL 60 dBA and Greater, Proposed Action, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres						
Baseline Acres	732	713	577	582	1,896	4,500
Proposed Action	766	662	583	649	1,719	4,379
Change	+34	-51	+6	+67	-177	-121
Percent Change	+5%	-7%	+1%	+12%	-9%	-3%
Population						
Baseline Population	3,791	1,868	214	0	0	5,873
Proposed Action	4,045	890	208	0	0	5,143
Change	+254	-978	-6	0	0	-730
Percent Change	+7%	-52%	-3%	0%	0%	-12%
Population Highly Annoyed						
Baseline Population	455	411	79	0	0	945
Proposed Action	485	196	77	0	0	758
Change	+30	-215	-2	0	0	-187
Percent Change	+7%	-52%	-3%	0%	0%	-20%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Table 4.3.3-3 Summary of Off-Base Land Area and Population Exposed to, and Population Potentially Highly Annoyed by CNEL 60 dBA and Greater, Proposed Action, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres						
Baseline Acres	28,485	18,836	11,161	2,149	1,423	62,504
Proposed Action	23,693	18,489	5,304	1,578	859	49,923
Change	-4,792	-347	-5,857	-571	-564	-12,131
Percent Change	-17%	-2%	-52%	-27%	-40%	-20%
Population						
Baseline Population	464	190	38	10	4	706
Proposed Action	302	133	18	7	2	462
Change	-162	-57	-20	-3	-2	-244
Percent Change	-35%	-30%	-53%	-30%	-50%	-35%
Population Highly Annoyed						
Baseline Population	56	42	14	5	2	119
Proposed Action	36	29	7	4	1	77
Change	-20	-13	-7	-1	-1	-42
Percent Change	-36%	-31%	-50%	-20%	-50%	-35%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Single Event Noise Analysis

Sound Exposure Level

Each aircraft overflight near a specific analysis point yields a single-event noise level, presented as SEL. A total of eight representative specific analysis points were selected under the traffic patterns and around the airfield to calculate the SEL from aircraft overflight. The noise contour and aircraft ground track figures show the locations of the specific analysis points.

C-17 aircraft operate at Travis AFB as transient aircraft under the baseline condition. Although there would be additional C-17 operations at the Base under the Proposed Action, there would be no change in the aircraft ground tracks or flight profiles for the aircraft. Likewise, there would be no change in the other types of aircraft that operate at the Base. Thus, there would be no change in the SEL listed in Table 3.1.3-2 since SEL is related to the single event on a flight track.

Sleep Disturbance

Based on FICAN recommendations, outdoor SELs of 80 to 100 dBA (60 to 80 dBA indoors) could result in 4 to 10 percent awakenings, respectively, in the exposed population. Over the course of sleeping, different individuals might be awakened by different events, and

some individuals might be awakened more than once. Individuals in residences in the area around the Base would continue to be exposed to indoor SEL of 60 to 80 dBA during normal sleep periods (10:00 p.m. to 7:00 a.m.). There would be 974 fewer persons exposed to CNEL 60 dBA and greater as a result of the Proposed Action. Assuming the number of sleep awakenings would be proportional to the decrease in exposed population, it is anticipated there would be the potential for about 97 fewer persons awakened when comparing the Proposed Action to the baseline condition.

Effects of Noise on Structures

Studies have shown that damage to structures (*e.g.,* window breakage, wall cracks, foundation cracks) from external pressures and induced vibrations would not occur at 127 dB and below (see Table 3.1.3-3). The highest maximum sound pressure level produced by any of the aircraft assigned to Travis AFB at a distance of 1,000 feet would be 106 dBA generated by the C-5 aircraft. The maximum sound pressure levels and at a distance of 1,000 feet for the C-17 and KC-10 would be 91 dBA and 92 dBA, respectively. The maximum sound pressure at 100 feet from a C-17 would be about 112 dBA. The maximum sound pressure is the highest instantaneous sound pressure during a single noise event no matter how long the sound may persist. Maximum sound pressure is different than SEL, which is the A-weighted sound level integrated over the duration of the noise event and adjusted to a length of 1 second. Therefore, no damage to structures in the area surrounding Travis AFB would be anticipated because the sound pressure produced by the aircraft would not exceed the level at which structural damage could occur.

Construction Noise

The primary source of noise from the facilities would be the equipment involved in construction activities. Construction noise would be intermittent and short-term in duration. Typical noise levels from heavy equipment ranges from 75 to 89 dBA at 50 feet from the source (Table 4.3.3-4).

Table 4.3.3-4 Heavy Equipment Noise Levels at 50 Feet

Equipment Type	Number Used	Generated Noise Levels, L_p (dBA)
Bulldozer	1	88
Backhoe (rubber tire)	1	80
Front Loader (rubber tire)	1	80
Concrete Truck	1	75
Concrete Finisher	1	80
Crane	1	75
Asphalt Spreader	1	80
Roller	1	80
Flat Bed Truck (18 wheel)	1	75
Scraper	1	89
Trenching Machine	1	85

It is estimated the shortest distance between a noise source from construction activity and a person in or outside a building adjacent to the construction site would be about 100 feet. Conservatively, outdoor noise for a person at this distance could range from as high as 71 to

85 dB at 100 feet from the source. Interior noise levels would be reduced from the 71 to 85 dB level by approximately 20 dBA due to the noise level reduction properties of the building's construction materials (United States Department of Transportation [USDOT] 1992). It is anticipated that demolition and construction activities would occur between 7:30 a.m. and 4:00 p.m., 5 days per week for the duration of the project. The noise would be temporary and occur only during hours of construction, demolition, or renovation activity and would cease when the project is completed.

Elevated noise levels from construction activity can interfere with speech, causing annoyance or communication difficulties. Based on a variety of studies, DNL 75 dBA indicates a good probability for frequent speech disruption. This level produces ratings of "barely acceptable" for intelligibility of verbal communication. Persons conducting conversations within the construction area could have their speech disrupted by construction, demolition, or renovation-generated noise. Speech disruption would be temporary, lasting only as long as the noise-producing event.

No hearing loss anticipated for persons outdoors because they would not be exposed to DNL equal to or greater than 75 dBA for 40 years of exposure at 16 hours per day, the level at which hearing loss could occur. Sleep interference is unlikely because demolition, construction, and renovation activities would occur only during daytime.

The primary source of noise at Travis AFB during construction activities would continue to be from airfield operations and aircraft maintenance activities. Noise from these sources would tend to mask the noise generated by construction projects for the same exposure area. The perception is that construction noise would likely not be discernible during periods of airfield operations and aircraft maintenance activity. However, there could be periods of time during which construction noise could be discerned. This condition would occur when construction activity is underway and aviation-related activity is low.

Day-Night Noise Analysis, Travis AFB

Overall, the Proposed Action noise contours would retain the same basic shape as the baseline contours (see Figure 4.3.3-2), with the number of combined on-Base and off-Base acres in the CNEL 60 dBA and greater exposure area decreasing by 18 percent. The primary area of decrease is to the northeast where the closed CNEL 60 dBA "loop" "opens." Although the CNEL 60 dBA area to the southeast of the airfield remains nearly the same as the baseline, there are areas where the CNEL 65 and 70 dBA contours retract toward the airfield. The basis for the decrease in exposure is the reduction in C-5 operations.

As indicated in Table 4.3.3-1, the CNEL would decrease by as much as 2 dBA at seven of the analysis points and remain the same at the other point. Assuming the analysis points are representative of points within the area around the airfield and based on the fact that the CNEL would remain the same or decrease at each of the eight points, it is anticipated that the CNEL would not increase at any point within the area around the airfield or below the aircraft flight tracks.

While there would be a 7 percent increase in the number of on-Base persons in the CNEL 60-65 dBA noise zone (see Table 4.3.3-2), there would be 52 fewer persons (3 percent), respectively, in the CNEL 65-0 and 70-75 dBA noise zones. The total number of people exposed to CNEL 60-dBA and greater would decrease by 730 persons (12 percent). The overall number of persons who would be highly annoyed by noise exposure would decrease by 187 people (20 percent).

As indicated in Table 4.3.3-3, there would be fewer off-Base persons in each of the five noise zones, with the overall number of persons exposed to CNEL 60 dBA and greater decreasing by about 244 people (35 percent). The overall number of persons who would be highly annoyed by noise exposure would decrease by 42 people (35 percent).

On the basis of a variety of studies, there is good probability of frequent speech disruption from aircraft overflight that produces outdoor CNEL 75 dBA. This level produces ratings of "barely acceptable" for intelligibility of spoken communication. However, since the total duration is no more than a few seconds during each overflight, only a few syllables may be lost. As a result of potential Proposed Action aircraft overflight noise above this level, speakers may have to raise their voices during conversation, or move closer to listeners to compensate for intruding noise in face-to-face communication. As the intruding (masking) noise level rises, speakers may cease talking until conversation can be resumed at comfortable levels. If the speech source is a radio or television, the listener may increase the volume during noise intrusion. In addition to losing information contained in masked speech, the listener may lose concentration because of the interruptions and become annoyed. Assuming the number of conversations is proportional to the decrease in exposed population and the reduction in airfield operations, it is anticipated there would be a corresponding decrease in the potential for speech disruption.

An outdoor CNEL 75 dBA is considered the threshold above which the risk of noise-induced hearing loss should be evaluated. An average of 1 dBA of hearing loss could be expected for people exposed to CNEL equal to or greater than 75 dBA. For the most sensitive 10 percent of the exposed population, the maximum anticipated hearing loss would be 4 dBA. These hearing loss projections must be considered conservative, as the calculations are based on an average daily outdoor exposure of 15 hours (7:00 a.m. to 10:00 p.m.) over a 40-year period. It is doubtful that any individual would spend this amount of time outdoors within the noise exposure area. Therefore, noise-induced hearing loss would not be anticipated from airfield operations associated with the Proposed Action.

Predictions of nonauditory health effects from aircraft noise cannot be made. Therefore, nonauditory health effects cannot be analyzed.

Speech in school classrooms exposed to aircraft noise could become masked or the teacher could stop talking altogether during an aircraft noise event. Teachers may choose to pause their speech to avoid interference with noise when it reaches a level of 60 dBA. Masking of the speech of teachers who do not pause would start about the same level. At levels of 75 dBA, some masking would occur for 15 percent of the specific noise events. Masking would increase to nearly 100 percent at 82 dBA, and pauses would occur for about 80 percent of the specific noise events. Since a marked increase in pauses and masking would

occur when levels exceed 75 dBA, this level is sometimes considered to be the level above which teaching would be impaired as a result of disruption of speech communication. However, the effect that the disruption would have on learning is unclear.

Under the Proposed Action, the outdoor CNEL at the schools identified for analysis (*i.e.*, analysis points 2, 4, and 5) would decrease by 1, 2, and 1 dBA, respectively. The greatest CNEL at any school would be 53 dBA, while the C-17 outdoor SEL would be 77 dBA. Indoor noise levels are generally 20 decibels lower than outdoor noise levels because building structures attenuate the outdoor noise levels.

In summary, there would be a reduction in speech disruption from aircraft overflight and there should be no noise-induced hearing loss impacts. Classroom disruption should decrease due to the lower aircraft-produced noise at the schools and the fewer overflights due to the reduction in airfield operations. The overall effect of the Proposed Action at Travis AFB would be a 15 percent decrease in the number of people exposed to CNEL 60 dBA and greater.

4.3.3.2 Military Training Routes

Table 4.3.3-5 lists the annual and monthly operations anticipated for the 19 MTRs under the Proposed Action. The data in the table reflect the addition of the proposed C-17 operations to the baseline condition. It is assumed the baseline operations and operations by aircraft type would continue under the Proposed Action.

Table 4.3.3-5 Anticipated Proposed Action Military Training Route Operations

	Operations			
	Baseline		Proposed Action	
Route	Annual	Monthly	Annual	Monthly
IR-203	6	<1	68	5
IR-207/208	42	4	104	9
VR-202	56	5	118	10
VR-249	84	7	146	12
VR-1205	68	6	130	11
VR-1215	2	<1	64	5
SR-300/301	264	22	386	32
SR-311/359	0	0	86	7
IR-212	10	<1	36	2
IR-236	0	0	26	2
VR-201	228	19	254	21
VR-208	71	6	95	8
VR-1250	33	3	59	5
VR-1252	5	<1	31	2
VR-1254	20	2	46	4
SR-381	0	0	24	2

Note: Monthly operations rounded to the nearest whole number.

Table 4.3.3-6 compares the L_{dnmr} for the C-17 and other aircraft operations that would occur on the specific routes with the baseline condition. As indicated in the table, the L_{dnmr} ranges from a low of 36 dBA to a high of 62 dBA. As indicated in Table 4.3.3-6, the L_{dnmr} would exceed 55 dBA on five routes, VRs-202, 249, 1205, 201, and 208. Although, the L_{dnmr} would exceed 55 dBA on these five routes, the noise level would remain the same as the baseline condition. There is no reason to expect the general population to be at risk from any of the effects of noise for sound levels at and below L_{dnmr} 55 dBA (USEPA 1974). Additionally, the L_{dnmr} 62 dBA anticipated for VR-201 would not exceed the HUD, FAA, and Air Force noise level (*i.e.*, L_{dnmr} 65 dBA) at which residential and other noise-sensitive land uses would be unacceptable. The L_{dnmr} would be a maximum of 5 dBA greater than the values stated in Table 4.3.3-6 at the points at which the MTRs intersect or when there are common route segments. Thus, the maximum L_{dnmr} for any route could be about 67 dBA.

Table 4.3.3-6 Comparison of Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Proposed Action

	L_{dnmr} (dBA)				L_{dnmr} (dBA)		
Route	**Baseline**	**PA**	**Chg.**	**Route**	**Baseline**	**PA**	**Chg.**
IR-203	47	48	+1	IR-212	43	44	+1
IR-207/208	49	50	+1	IR-236	NA	36	--
VR-202	56	56	0	VR-201	62	62	0
VR-249	59	59	0	VR-208	57	57	0
VR-1205	56	56	0	VR-1250	51	51	0
VR-1215	40	42	+2	VR-1252	34	38	+4
SR-300/301	46	48	+2	VR-1254	52	52	0
SR-311/359	NA	41	--	SR-381	NA	36	--

Note: L_{dnmr} is represented for 300 feet AGL. Travis AFB intends to request the unit responsible for scheduling and coordinating IR-207 to take the actions necessary to establish IR-208. IR-208 would have an identical route structure as IR-207, but would be flown in the opposite direction. The combined total number of operations on IR-207/208 after establishment of IR-208 would exceed the number listed for IR-207 in Table 2.6. Thus, noise modeling for IR-207 includes IR-208 operations should the route be established. NA=route not flown in 2002 and L_{dnmr} would be 0. N/A=not applicable. Route not flown in FY02. Thus, change not calculated.

The noise anticipated from MTR operations would not exceed the level used for hearing loss and speech interference analysis (*i.e.*, L_{dnmr} 75 dBA), and the discussion for these two items in the Proposed Action (Subchapter 4.3.3.1) apply to MTR operations. Likewise, the sleep disruption and non-auditory health effects discussions from the Subchapter apply.

Table 4.3.3-7 lists the SEL values for the C-17 for points directly below and lateral to the aircraft ground track. It is assumed the other aircraft types using the routes would be the same as the baseline condition. Thus, the SEL information in Table 3.1.3-9 would apply to the other aircraft that would continue to use the MTRs under the Proposed Action. Both the L_{dnmr} and SEL decrease as the distance between the receptor and the route centerline increases.

Table 4.3.3-7 Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Proposed Action

Aircraft	200 Feet	315 Feet	1,000 Feet	2,000 Feet	3,150 Feet
C-17	106	103	92	84	78

Note: There would be no change in the other types of aircraft that fly the routes. Thus, there would be no change in the SEL for those aircraft and only the C-17 is listed. Table 3.1.3-11 lists the data for the other aircraft types.

The L_{max} for a C-17 at 300 feet AGL, the minimum altitude flown on an MTR, would be about 100 dBA, which is well below the threshold at which structural damage would occur (*i.e.*, 127 dBA). Thus, no structural damage would be expected from C-17 operations on an MTR.

Studies of aircraft noise and sonic booms, both in the U.S. and overseas, have addressed acute effects, including effects of startle responses (sheep, horses, cattle, fowl), and effects on reproduction and growth (sheep, cattle, fowl, swine); parental behaviors (fowl, mink); milk letdown (dairy cattle, dairy goats, swine); and egg production. High noise may trigger a startle response which raises the heart rate, but heart rate returns to normal in a very short time. There are good dose-response relationships describing the startle tendency to various levels of noise. However, studies have determined that there would be no long-term behavioral nor breeding effects.

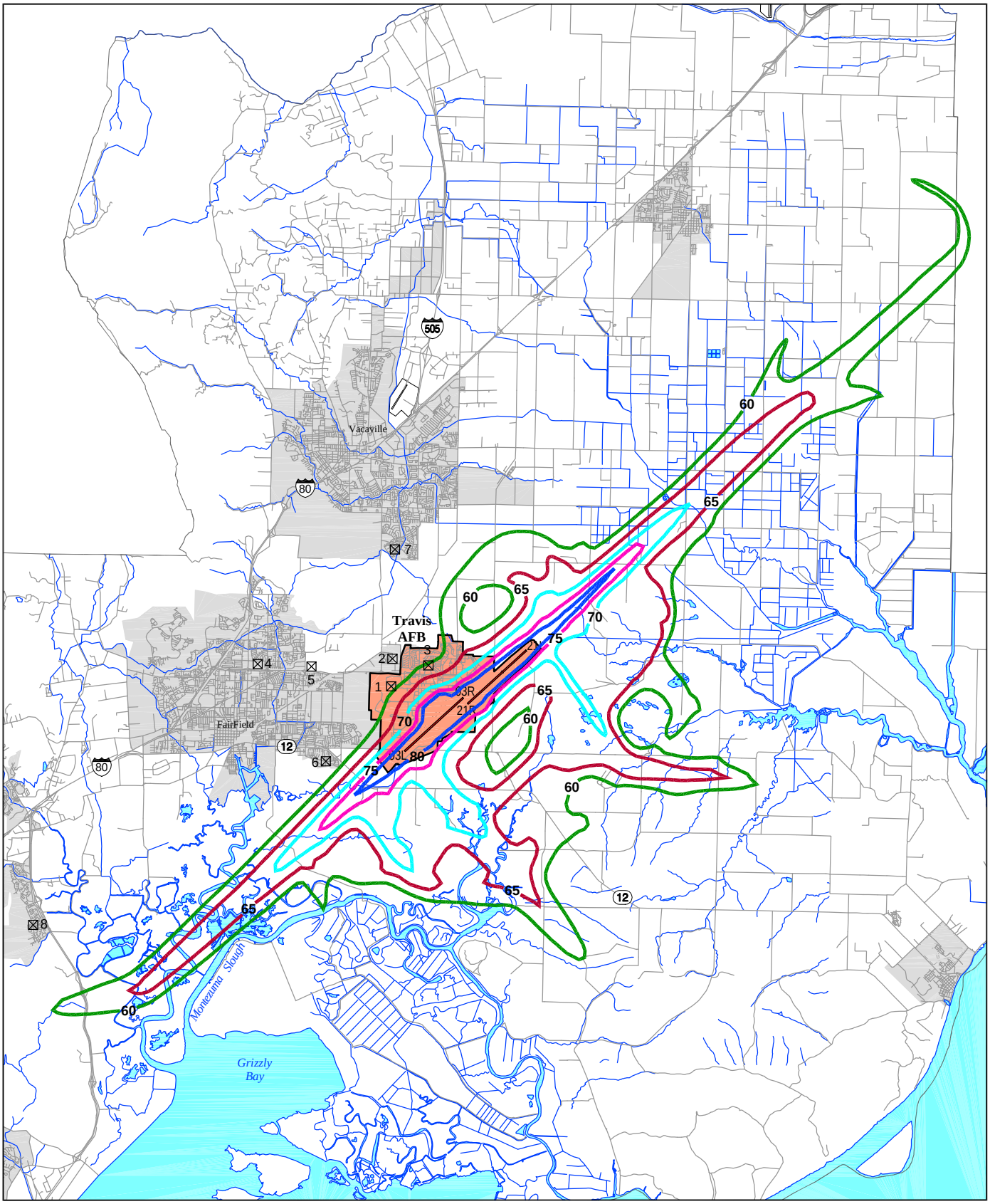
Studies on wildlife have shown that noise levels as high as 95 dBA have little or no effect on turkey vultures, great egrets, and grebes. Noise levels between 85 to 95 dBA could disturb or agitate the ring-necked duck, coot, gadwall, purple gallinule, and pintail duck. Noise levels within the range of 110 to 135 dBA would affect the nesting of turkeys. Another study, using low flying F-16 aircraft, has shown that noise levels of up to 100 dBA would not alter the reproductive behavior of the great egret, snowy egret, tricolor heron, little blue heron, and cattle egret.

4.3.3.3 Mitigation

No noise impacts were identified. Therefore, no mitigation would be required.

4.3.3.4 Cumulative Impacts

Under the cumulative condition other facilities would be constructed and Coast Guard C-130 aircraft would operate from the airfield at Travis AFB. Figure 4.3.3-6 depicts the noise exposure area for the Proposed Action cumulative condition and Figure 4.3.3-7 compares the condition with the baseline. There would be no change to the baseline condition aircraft ground tracks under the cumulative condition at Travis AFB (see Figure 3.1.3-3).



Travis Air Force Base

LEGEND

- CNEL 60 dBA Contour
- CNEL 65 dBA Contour
- CNEL 70 dBA Contour
- CNEL 75 dBA Contour
- CNEL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- Travis AFB

19,000 0 19,000

Feet

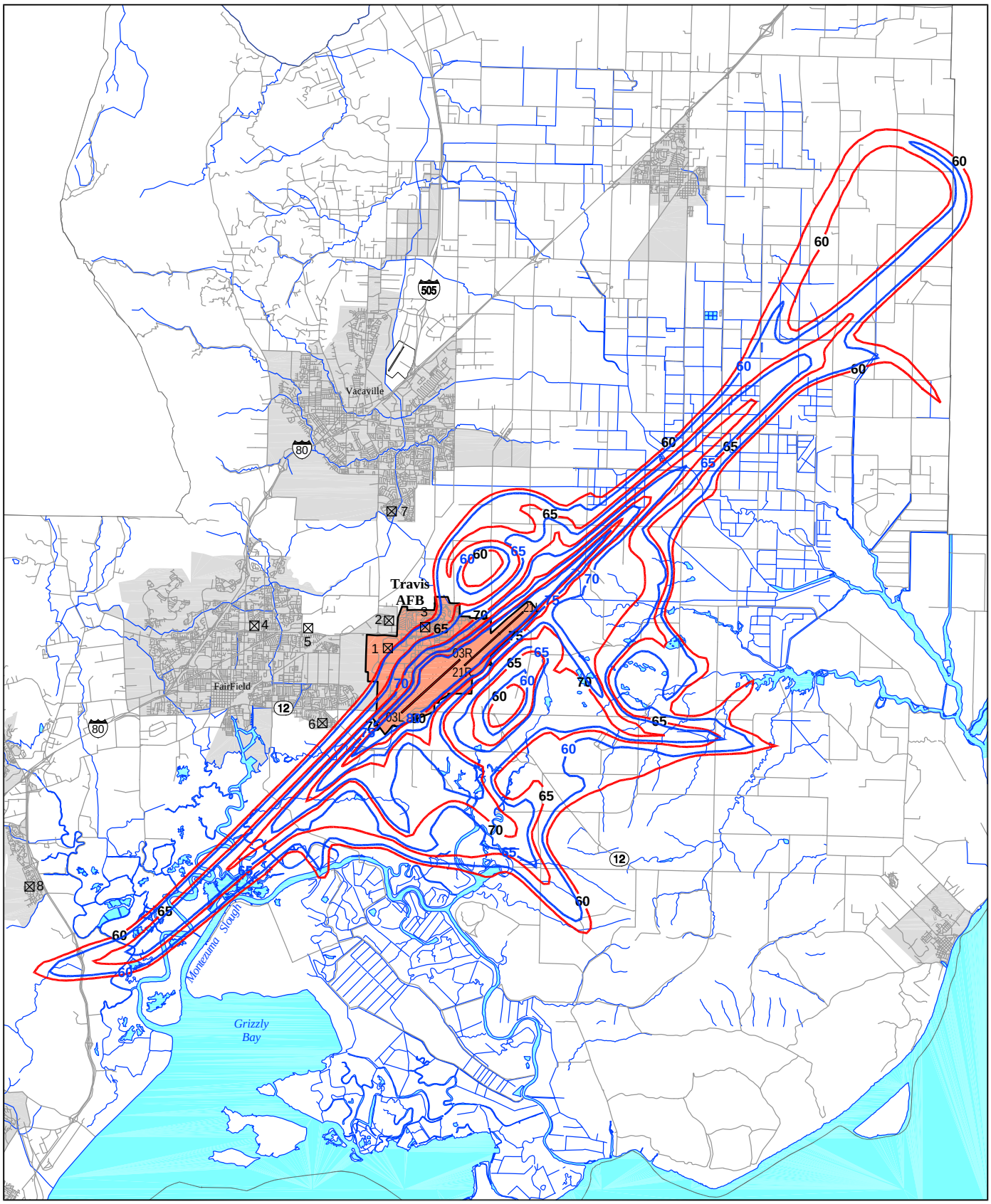
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Cumulative Impact Noise Contours Travis AFB

Figure 4.3.3-3

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Travis Air Force Base

LEGEND

- Baseline Noise Contours
- Cumulative Impact Noise Contours
- Runway
- Roadway
- Analysis Point
- Travis AFB

19,000 0 19,000

Feet

N

Comparison of Baseline and Cumulative Impact Noise Contours Travis AFB

Figure 4.3.3-4

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Table 4.3.3-8 compares the SEL for the C-17 and C-130 aircraft and Table 4.3.3-9 lists the SEL and L_{max} for the C-130 at 1,000 feet from the aircraft. Table 4.3.3-10 compares the on-Base land area and population exposed to noise of CNEL 60 dBA and greater, as well as the population potentially highly annoyed, for the Proposed Action cumulative condition with the baseline condition. Table 4.3.3-11 presents the same comparison for the off-Base area. There would be an overall 15 percent decrease in the number of people exposed to CNEL 60 dBA and greater. The data from these tables are used in the single event and day-night sound discussions in this section.

Table 4.3.3-8 Comparison of Sound Exposure Level from Proposed C-17 and C-130 Airfield Operations at Specific Analysis Points, Cumulative Condition, Travis AFB

		SEL(dBA)	
Number	**Description**	**C-17**	**C-130**
1	Base Hospital	80	72
2	Schools	78	71
3	Base Housing	85	77
4	Fairfield High School	76	66
5	School	78	67
6	Residential Area	82	76
7	Residential Area	78	70
8	Residential Area	82	74

Note: There would be no change to the SEL for C-5, KC-10, and transient C-141 and C-17 aircraft since there are no changes to the flight tracks or profiles these aircraft would fly. Thus, for comparison purposes, SEL is listed only for C-17 and C--130 aircraft. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures.

Table 4.3.3-9 Sound Exposure Level and Maximum Sound Level for C-130 Aircraft at 1,000 feet from the Aircraft

Aircraft Type	Sound Exposure (SEL) (dBA)	Maximum Sound Level (L_{max}) (dBA)*
C-130	91	85

Note: At nominal takeoff thrust and airspeed and at a slant distance of 1,000 feet from the aircraft.

Table 4.3.3-10 Summary of On-Base Land Area and Population Exposed to, and Population Potentially Highly Annoyed by CNEL 60 dBA and Greater, Cumulative Condition, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres						
Baseline Acres	732	713	577	582	1,896	4,500
Cumulative Condition	767	665	579	648	1,722	4,381
Change	+35	-48	+2	+66	-174	-119

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Percent Change	+5%	-7%	0%	+11%	-9%	-3%
Population						
Baseline Population	3,791	1,868	214	0	0	5,873
Cumulative Condition	4,052	894	208	0	0	5,154
Change	+261	-974	+208	0	0	-719
Percent Change	+7%	-52%	-3%	0%	0%	-20%
Population Highly Annoyed						
Baseline Population	455	411	79	0	0	945
Cumulative Condition	486	197	77	0	0	760
Change	+31	-214	-2	0	0	-185
Percent Change	+7%	-52%	-3%	0%	0%	-20%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Table 4.3.3-11 Summary of Off-Base Land Area and Population Exposed to, and Population Potentially Highly Annoyed by CNEL 60 dBA and Greater, Cumulative Condition, Travis AFB

	CNEL Interval (dBA)					
Category	**60-65**	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres						
Baseline Acres	28,485	18,836	11,161	2,149	1,423	62,504
Cumulative Condition	23,631	18,626	5,260	1,587	500	49,604
Change	-4,854	-210	-5,901	-562	-923	-12,450
Percent Change	-17%	-1%	-53%	-26%	-65%	-20%
Population						
Baseline Population	464	190	38	10	4	706
Cumulative Condition	302	133	18	7	2	462
Change	-162	-57	-20	-3	-2	-244
Percent Change	-35%	-30%	-53%	-30%	-50%	-35%
Population Highly Annoyed						
Baseline Population	56	42	14	5	2	119
Cumulative Condition	36	29	7	4	1	77
Change	-20	-13	-7	-1	-1	-42
Percent Change	-36%	-31%	-50%	-20%	-50%	-35%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Single Event Sound Analysis, Travis AFB

Noise modeling indicates the C-130 is a quieter aircraft than the other aircraft based at Travis AFB. For example, it is estimated the C-130 SEL at analysis point 2 would be 71 dBA, while the C-17 SEL at the point would be 78 dBA. The sleep disturbance and effect of noise on structures noise analyses for the Proposed Action apply to the cumulative condition.

As depicted in Figures 2.4.2-4 and 2.5.1-1, the distance between one of the other action construction sites and a Proposed Action site could be as close as 100 feet. For analysis purposes, it is assumed the noisiest piece of construction equipment (89 dB scraper which produces 85 dB at 100 feet from the noise source) is being operated simultaneously at each site and the distance to a receptor is 100 feet from each construction site. If the intensity of a sound is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, the combined noise from equipment operation at the receptor would be 88 dB. As with the Proposed Action, construction noise would be temporary and occur only during hours that construction, demolition, or renovation activity would occur and would cease when the project is completed.

Day-Night Sound Analysis, Travis AFB

Overall, the Proposed Action cumulative condition contours would retain the same basic shape as the baseline contours (see Figure 4.3.3-7), with the number of combined on-Base and off-Base acres in the CNEL 60 dBA and greater exposure area decreasing by 19 percent. The primary area of decrease is to the northeast where the closed CNEL 60 dBA "loop" "opens." Although the CNEL 60 dBA area to the southeast of the airfield remains nearly the same as the baseline, there are areas where the CNEL 65 and 70 dBA contours retract toward the airfield. The basis for the decrease in exposure is the reduction in C-5 operations.

While there would be a 7 percent increase in the number of on-Base persons in the CNEL 60-65 dBA noise zone (see Table 4.3.3-10), there would be 52 persons (3 percent fewer), respectively, in the CNEL 65-70 and 70-75 dBA noise zones. The total number of people exposed to CNEL 60 dBA and greater would decrease by 719 persons (12 percent). The overall number of persons who would be highly annoyed by noise exposure would decrease by 185 people (20 percent).

As indicated in Table 4.3.3-11, there would be fewer off-Base persons in each of the five noise zones, with the overall number of persons exposed to CNEL 60 dBA and greater decreasing by about 244 people (35 percent). The overall number of persons who would be highly annoyed by noise exposure would decrease by 42 people (35 percent).

The discussions and analyses for the Proposed Action for speech disruption, hearing loss, nonauditory health effects, and classroom disruption apply to the cumulative condition. The overall effect of the cumulative condition at Travis AFB would be a 15 percent decrease in the number of people exposed to CNEL 60 dBA and greater.

4.3.4 Hazardous Wastes, Hazardous Materials, and Stored Fuels

Impacts to hazardous materials management would be considered significant if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current the Base's current waste management procedures and capacities. Impacts to fuels management would be significant if the established management policies, procedures, and handling capacities could not accommodate the activities associated with the proposed action.

4.3.4.1 Travis AFB

Hazardous Wastes

Hazardous wastes would be generated during the construction activities. It is anticipated that the quantity of hazardous wastes generated during the construction period would be negligible. The construction contractor would maintain records of all waste determinations, including appropriate results of analysis performed, substances and sample locations, date and time of collection, and other pertinent data as required by 40 CFR Part 280, Section 74 and 40 CFR, Part 262, Subpart D.

In the event of a spill of any amount or type of hazardous material or waste (petroleum products included), the construction contractor would take immediate action to contain and clean up the spill. Contractor spill clean up personnel would be trained and certified to perform spill clean up. The contractor would be responsible for proper characterization and disposal of any waste and clean up materials generated. All waste and associated clean up material would be removed from the project site and transported and/or stored in accordance with regulations until final disposal.

Hazardous wastes generated by C-17 operation and maintenance activities would be similar in nature with baseline condition waste streams from existing activities at Travis AFB. The primary waste producing processes would continue to include aircraft parts cleaning, fluid changes for routine aircraft and vehicle maintenance, aircraft corrosion control, facility, and infrastructure maintenance. Any hazardous waste generated would be handled in accordance with all federal, state, and local laws and regulations, including RCRA requirements for waste management and USDOT requirements for waste transport.

Since the number of aircraft assigned to Travis AFB would decrease by four, and because the C-17 and C-5 are similar aircraft (*i.e.*, both four-engine transport), it is anticipated the volume of hazardous wastes generated under the Proposed Action would decrease by about 6 percent when compared to the baseline. Additional storage capacity should not be needed and the Base would continue to be a large quantity generator. No impact would be anticipated for the capacity of the TSDF or any of the tanks used for recyclable oils and fuels. If needed, Travis AFB would revise its existing Integrated Contingency and HAZMAT Plans to incorporate the activities of the Proposed Action. The Plans would be revised to reflect any additional procedures necessary to achieve and maintain regulatory compliance regarding accumulation, transportation, and disposal of hazardous waste.

Hazardous Materials

Products containing hazardous materials would be procured and used during the proposed construction activities for the Proposed Action. Contractors would be required to use and store hazardous materials in accordance with all federal, state, and local regulations.

Since the number of aircraft assigned to Travis AFB would decrease by four aircraft and because the C-17 and C-5 are similar aircraft, it is anticipated that no new hazardous material types would be needed and that hazardous material procurement could decrease by 6 percent. During operations, release of hazardous materials may potentially occur where materials are stored, during transport and during use or application. The existing hazardous materials handling processes and procedures could accommodate the activities associated with C-17 operation and maintenance.

Stored Fuels

The petroleum products that would be used under the Proposed Action are similar in nature to those used by the current aircraft activities at Travis AFB. Fueling and lubrication of equipment would be conducted in a manner that affords maximum protection against spills. Since the number of aircraft assigned to Travis AFB would decrease by four aircraft and because the C-17 and C-5 missions are similar, it is anticipated that the amount of fuel needed for operations could decrease by 6 percent. The existing fuels storage and handling processes and procedures could accommodate the activities associated with C-17 operation and maintenance.

4.3.4.2 Mitigation

No significant hazardous materials, hazardous, or stored fuels impacts would be anticipated. Therefore, no mitigation would be required.

4.3.4.3 Cumulative Impacts

Overall, the number of aircraft assigned to Travis AFB would increase by a maximum of four aircraft. Because the Travis AFB assigned C-17, C-5, and KC-10 aircraft would be similar to the C-130 (*i.e.*, all large three or four-engine transport), it is anticipated the waste generated per C-130 aircraft would be very similar to that for the assigned aircraft. For these reasons, it is estimated the volume of hazardous wastes generated under the Proposed Action cumulative condition would increase by about six percent above the baseline condition. The Base would continue to be a large quantity generator and it is anticipated the Base has the capacity to store the additional hazardous waste from C-130 activity. The waste streams from C-130 activity would be the same as that for the other assigned aircraft. If needed, Travis AFB would revise its existing HWMP to incorporate the activities of the Proposed Action. The Plan would be revised to reflect any additional procedures necessary to achieve and maintain regulatory compliance regarding accumulation, transportation, and disposal of hazardous waste.

The construction contractor for other projects at Travis AFB would comply with applicable regulatory guidance as described for the Proposed Action. When completed, the activities at the other facilities would be managed in accordance with applicable Base plans for hazardous waste, hazardous materials, and stored fuels. It is anticipated hazardous materials procurement would increase six percent. The additional JP-8 requirement for C-130 operations could be accommodated by the Base fuels system. No significant hazardous waste, hazardous materials, and stored fuels impacts would be anticipated.

4.3.5 Water Resources

The significance of water quality impacts is based on the applicable regulations, codes, and plans for the resources affected. Impacts would be considered significant if any of the following conditions would occur as a result of the project: (1) a discharge that creates a chronic and/or critical condition, damage to the ecosystem, or pollution as defined in federal, state, or local regulations; (2) a discharge, as a result of construction or operation of the proposed project, that impairs the beneficial uses of surface and groundwater beneath or adjacent to the proposed project as set forth in federal, state, or local regulations; and (3) release of contaminants to the groundwater in such concentrations that they would exceed maximum contaminant levels specified in the Safe Drinking Water Act (40 CFR 141) for drinking water in monitoring wells in the immediate area.

4.3.5.1 Travis AFB

Surface Water

Runoff from construction areas could contain contaminants that could degrade the quality of receiving waters in Union and McCoy Creeks. The potential for erosion and sedimentation could occur as a result of construction that requires grading or other earthmoving activities during construction of new facilities. These activities could result in soil disturbance and increased erosion and sedimentation that could potentially enter surface waters if not properly managed. Standard erosion control measures to prevent storm water pollution would be incorporated into facility construction and design to minimize soil disturbance, and prevent erosion and sedimentation, at the work site. Measures to prevent discharge of contaminants into surface waters would be followed during construction. Dredged and/or fill material would not be discharged into Union Creek as a result of construction work along Ragsdale Street. The Air Force would ensure that the SWPPP for Travis AFB is updated to incorporate new facilities and operations associated with the Proposed Action. In the event groundwater is encountered during construction, the construction contractor would temporarily suspend work and notify the Base Environmental Flight or Base Bioenvironmental Engineering.

Procedures for spill prevention and response, routine inspection of discharges at sites, and proper training of employees have been included in facility planning documents. With implementation of these practices, impacts to water quality at Travis AFB would not be considered significant.

The Air Force would ensure that specific mitigation measures identified in the Section 404/401 permitting process with the USACE are implemented during construction and operation. Best management practices would include construction methods and preventive measures to ensure that any work in the creekbed is conducted in an environmentally responsible manner.

The amount of impervious cover would increase by 1,210,758 square feet (27.8 acres), which represents an approximate 1.4 percent increase over baseline conditions. Therefore, the volume of storm water runoff should not increase significantly above the existing conditions.

Groundwater

Ten facilities would be constructed on or adjacent to seven ERP sites that consist of contaminated soils and groundwater at depths of 5 feet bgs (see Table 3.1.12-1). Design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would not result in disturbance of contaminated groundwater. The Air Force would ensure that the contractor coordinates construction activities with the Base Environmental Flight and Bioenvironmental Engineering to ensure that areas of contaminated groundwater are avoided if possible. In the event groundwater is encountered during construction, the construction contractor would temporarily suspend work and notify the Base Environmental Flight or Base Bioenvironmental Engineering.

Floodplains

The Proposed Action at Travis AFB would require realignment of Ragsdale Street within floodplain areas associated with the western branch of Union Creek. The proposed roadway would include two box culverts in Union Creek. The culverts would be constructed in accordance with design standards for floodplains and associated Section 404 permit requirements.

4.3.5.2 Mitigation

No significant surface and groundwater or floodplain impacts would be anticipated. Therefore, no mitigation would be required.

4.3.5.3 Cumulative Impacts

As with the Proposed Action, the construction contractor for other projects would be required to comply with applicable regulatory requirements and mitigate potentially significant impacts to water resources. When completed, activities at the other facilities would be managed in accordance with SWPPP. No cumulative impacts to surface water, groundwater, or floodplains would be anticipated.

4.3.6 Biological Resources

An impact to biological resources would be considered significant if the action would impact a threatened or endangered species, substantially diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere substantially with wildlife movement or reproductive behavior, and/or result in a substantial infusion of exotic plants or animal species.

4.3.6.1 Travis AFB

Construction activities associated with the Proposed Action would occur primarily within the existing developed portion of Travis AFB in areas previously been disturbed by past construction. The Proposed Action would not result in any impacts to vegetation, wildlife, or sensitive species on Travis AFB, with the exception of the two areas of road realignment at location 16, as shown on Figure 2.4.2-4. The proposed realignment of Ragsdale Street to meet the intersection of Ellis Drive and Dixon Avenue (including the crossing of Union Creek), and a road extension from the east end of T Street with Boyles Street and access to the flightline, could potentially result in impacts to Chinook salmon and vernal pool species.

Both road alignments would require new crossings over the west branch of Union Creek and installation of box culverts at these locations. These sites exhibit degraded habitat conditions in industrial surroundings. The waterway is channelized at these locations, and exotic species of vegetation are present. The design and placement of culverts for any crossings of Union Creek would follow guidelines provided by NMFS, Southwestern Region (NMFS 2001). Design considerations shall include hydraulic and structural features to enable fish passage as specified in the NMFS guidance.

Historically, Union Creek is intermittent, with flows corresponding to seasonal (November-March) wet periods. When Travis AFB was established, and prior to conservation considerations, there was a need to manage and control ground water and surface runoff, which lead to the channelization of Union Creek. The west branch of Union Creek is significantly degraded from natural conditions (USAF 2001). Under present conditions, due to collection of ground and surface water, Union Creek flows for most of the year.

Suitable habitat for the Pacific salmon does not occur (Bjornn and Reiser 1991). Union Creek lacks gravel substrate, shading trees, predictable and/or adequate flows, and stable temperatures - all required to maintain a healthy fishery. Historic records indicate that Pacific salmon or trout never occurred anywhere in Union Creek (NMFS 2000b, 2002c).

Recently, hatchery-reared stocks of Chinook salmon, a USFWS Candidate species, were identified in Union Creek. Direct communication with CDFG (G. Martinely, Stream Alteration Coordinator, *pers. comm.*) and NMFS (M. Aceituno, Project Leader Central Valley Office, Sacramento, CA, *pers. comm*.) indicated that further consultation on this matter was unwarranted. Agency representatives felt that, until significant improvements on salmon

habitat requirements are made to Union Creek, salmon will not pioneer Travis AFB successfully. These agency representatives indicated that construction or operation and maintenance activities of Travis AFB should include anadromous fish conservation measures.

Under the Proposed Action, a box culvert would be installed to accommodate the road crossings of Union Creek. Despite the lack of a viable salmon fishery, inclusive of suitable habitat, placement of culverts should follow guidelines provided by NMFS, Southwestern Region (NMFS 2001).

Although these stretches of Union Creek do not contain riparian vegetation or hydrologic conditions that would support riparian vegetation, the proposed road alignment and associated construction in the creek has the potential to affect downstream riparian/aquatic habitat quality. Potential adverse effects to Chinook salmon and other species that may be present approximately 1 mile from the site would be minimized by construction techniques that would be used during road realignment. The construction contractor would prepare and implement a storm water pollution prevention plan containing management practices to control sediment entering Union Creek. The contractor would install a debris curtain or other sediment control/protective barrier during any work in the creek that occurs when water is present to avoid impacts to Chinook salmon that may be present downstream.

The proposed road realignment that crosses a vacant field north of Ellis Drive, west of Ragsdale Street and east of the fuel tank farm, would result in direct impact to two vernal pools, Numbers 151 (low quality) and 152 (high quality) and an indirect impact to another pool 250 feet from the edge of the road realignment. The proposed road realignment at this location could result in the loss of a 0.515-acre of vernal pools, and potential degradation to another 0.485-acre pool. Since previous studies (Earth Tech 2000a, 2000b, 2001) did not confirm the presence or absence of listed species in these vernal pools, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset or mitigate potential adverse effects from road realignment. The analyses and conclusions in this EA are consistent with the Travis AFB INRMP.

4.3.6.2 Military Training Routes

The MTRs for the Proposed Action cover a broad geographic range in California, Nevada, and Oregon. The diversity of landforms and geography covered by the routes support a number of plant communities, which are categorized into several life zones. In general, MTR corridors are typically selected to avoid potential human-disturbance conflicts. However, travel across remote, less-densely populated sections of the western states results in increased contact between military overflights and natural resources. There are no known effects of low-level overflights of the MTRs to vegetation communities or plant species.

In some situations, noise and visual disturbance caused by military overflight may cause short-duration impacts to wildlife, or conflict with conservation purposes of National Wildlife Refuges (General Accounting Office 1989; USFWS 1993; Dewey and Mead 1994). Only when animals have little freedom of movement (*i.e.*, for escape) and/or are subjected to

intense sound volume and frequency would negative impacts likely to be measurable or long-lasting (Janis and Busnel 1978).

An increasing number of studies involving low-level, fixed-wing military overflights of varying intensity of sonic or sub-sonic noise (dBA) elicit little response from most free-roaming species, particularly birds and mammals (Platt 1977; Ellis 1981; Utah State University Foundation 1992; Grubb and Bowerman 1997; Johnson and Reynolds 2002). Numerous studies showing little or no effect on wildlife from aircraft-related noise and visual disturbances are reported by the USFWS (Gladwin *et al*. 1988).

The Proposed Action would result in C-17 aircraft flying within proposed MTR corridors. Activities would most likely result in immediate, non-harmful and short-duration responses by some wildlife. Wildlife would be expected to quickly habituate to sights and sounds associated with low-level aircraft overflights. In general, military overflights would be infrequent, random, and pose no threat to wildlife at the behavioral (individual), population, or species level.

Bird-Aircraft Strike Hazard

Collisions between aircraft and birds are an inherent risk. Use of MTRs for the Proposed Action would follow established Air Force procedures: VRs and IRs would be flown below 10,000 feet MSL at speeds in excess of 250 knots, while SRs would be flown below 1,500 feet AGL at speeds less than 250 knots. MTRs that would be used for the Proposed Action are not new and have been used for at least 20 years, being a selection of a wide range of MTRs nationwide.

Each of the MTRs for the Proposed Action was analyzed for BASH probabilities at biweekly intervals at four daily time periods (dawn, day, dusk, and night) using a 30-year cumulative, nationwide database. Using the hazard classifications of the bird avoidance model, each route or installation was ranked by daily time and bi-weekly period into severe, moderate, or low, with each assigned into high, medium, and low subcategories, calculated on grams per kilometer squared. This information is summarized in Table 3.1.11-3.

The area immediately surrounding Travis AFB was analyzed for BASH probability, as open habitat of runways and taxiways are increasingly used as hunting sites by raptors (Satheesan 1996). Data from the Breeding Bird Survey and Christmas bird counts were reviewed and considered for each MTR (Bystrak *et al*. 1974; Root 1988; Price *et al*. 1995; Sauer *et al*. 2001; National Audubon Society 2003). Specific BASH incidents for the Proposed Action MTRs provided by the Air Force BASH Team at Kirtland AFB, New Mexico were also evaluated.

Of 30 documented BASH incidents along the 19 MTRs from 1985 to 2002, 46 percent (14) occurred in the MTRs of the Proposed Action. For 27 incidents recording altitude, the average was 920 feet AGL, ranging from 200-2500 feet AGL. Eighty percent (24) total incidents occurred during daylight. Only 23 percent (7) could successfully identify bird species. Of these, 70 percent (5) were passerines (song birds), while the remaining 30 percent

(2) were raptors. About 52 percent (16) involved three routes; IR-326 (7), VR-201 (5), and IR-324 (4). Of these, VR-201 is an MTR that would be used by the Proposed Action.

Although the limited data do not yield meaningful analysis over such an extended period, some inferences can be made. BASH incidents increase at lower elevations during daylight hours. This increase follows general avian ecology, with species most active during the day. Most birds are not active at night, with some exceptions during migration periods (Martin 1990). Larger species (waterfowl and raptors) are hazardous singly (due to biomass) as opposed to smaller, passerine species. Any flocking species, regardless of size, is hazardous due to biomass density and consequences of multiple strikes.

Throughout the area covered by the MTRs, migratory and breeding birds did not appear to present a serious BASH risk, being moderate or low risk, including all subcategories. Severe hazards appeared only during winter months (late November-March) at specific locations; Siskiyou Mountains, Sacramento Valley, San Francisco Bay (Travis AFB). Hazards during wintering months in these areas may be attributed to high densities of migratory waterfowl, specifically Canada and Snow geese, shorebirds, and raptors (Bystrak *et al*. 1974; Root 1988; National Audubon Society 2003). For wintering waterfowl and shorebirds, the combination of food-rich fallow croplands (Sacramento Valley) and open water for resting (San Francisco Bay and surrounding irrigation waterways) is attractive for a variety of species in densities of tens of thousands each season (Olofson 2000). Travis AFB is located north of Suisun Bay, part of the San Francisco Bay area wetlands ecosystem, within a high-use wintering area for waterfowl and shorebirds (Root 1988; Olofson 2000; National Audubon Society 2003).

The MTRs for the Proposed Action would avoid severe BASH risk areas. For the Proposed Action, BASH risks would continue, especially at low altitudes. During winter months, Travis AFB is considered a severe BASH potential area. It should be noted that the BASH risk factor applies to any aircraft. BASH incidents would be expected to remain constant within the MTRs associated with the Proposed Action. For this reason, the BASH risks associated with the Proposed Action would not be considered significant.

4.3.6.3 Threatened, Endangered, and Special Status Species

Travis AFB

The discussion and analysis for Travis AFB in Subchapter 4.3.6.1 includes threatened, endangered, and special status species.

Military Training Routes

There are no known impacts of noise or overflight disturbance to threatened and endangered species of plants. Noise impacts to federally listed wildlife species is as discussed in Subchapter 4.3.6.1. Specific studies involving bald eagles and peregrines have shown both to tolerate low-flying jets without short- or long-term behavioral or reproductive impacts (Platt 1977; Ellis,1981; Grubb and Bowerman 1997).

AFI 11-202 and FAA regulations recommend all aircraft maintain a minimum altitude of 2,000 feet AGL over National Wildlife Refuges, National Parks, and Forest Service lands to minimize aircraft-wildlife conflicts, including BASH. Local operating procedures for C-17 aircraft would be developed to avoid overflight of known sensitive areas including areas critical for nesting and habitat for listed species of wildlife. These flight restrictions would be developed and implemented in the airspace and MTRs for the proposed operation of C-17 aircraft at Travis AFB. Use of the MTRs, including associated noise and visual disturbance would not affect listed plant or wildlife species.

4.3.6.4 Wetlands

The Proposed Action at Travis AFB would require relocation of Ragsdale Street with a crossing over Union Creek (refer to Subchapter 2.4.2.2 and Item 16 on Figure 2.4.2-4). Realignment of Ragsdale Street would include construction of a box culvert at Union Creek. The construction area along Ragsdale Street would be near wetlands found on both sides of Union Creek. The western branch of Union Creek has been channelized at this location. A second box culvert would be constructed further downstream on Union Creek as part of road improvements for FY03 (refer to Item 13 on Figure 2.4.2-4).

Federal law recognizes wetlands and other waters of the United States as valuable natural resources. These laws strongly discourage activities within federal jurisdiction that alter aquatic habitats. Alteration of wetlands near Ragsdale Street would be considered a potentially adverse impact. To prevent impact to the wetlands, a silt fence or other protective barrier would be installed between the wetlands and the project area. Work within the wetlands and in the Union Creek channel would require a Section 404/401 permit from the USACE and would comply with the provisions of the Section 1601 Streambed Alteration Agreement with the CDFG. Construction would be conducted in accordance with permit conditions. With adherence to permit stipulations, impacts to wetlands would be avoided.

4.3.6.5 Mitigation

As part of the Proposed Action to realign Ragsdale Street, the Air Force would purchase 2.515 acres of conservation credit in a suitable conservation bank site approved by the USFWS to offset potential adverse effects to vernal pools from the road realignment.

4.3.6.6 Cumulative Impacts

Travis AFB is a managed landscape; mowing, discing, building construction and urban-like improvements would be expected to continue into the foreseeable future, with or without the Proposed Action. Natural species diversity and continuity and connectivity of habitats would be expected to decline over the long term. Some species would thrive while others would be displaced and exotic species would most likely continue to increase and displace native species and communities. The Proposed Action cumulative condition biological resources impacts would not be considered significant.

4.3.7 Socioeconomic Resources

A socioeconomic impact would be considered significant if the federal action resulted in substantial growth or concentration of population or the need for substantial new housing or public services. The DoD standard (operations and maintenance) and construction models of the USACE Economic Impact Forecast System (EIFS) were used to forecast the effects of the Proposed and Alternative Actions. The standard model estimates the impacts of ongoing mission and operations as well as assessment of a change in operations. The construction model predicts the economic impacts of the expenditures and employment from construction activities. Using a technique termed the rational threshold value (RTV), EIFS estimates are compared to historic trends for each economic indicator (business volume [using non-farm income], personal income, employment, and population) to determine whether the impacts are significant. The RTV model analyzes annual changes since 1969, and establishes significance criteria based on historic deviations in the value of these four socioeconomic indicators. The EIFS calculates both positive and negative RTVs. This assessment assumes impacts associated with the proposed action would occur within Solano County.

4.3.7.1 Travis AFB

Population

When compared to the Vallejo-Fairfield-Napa PMSA population of 518,821 persons in 2000, the Proposed Action would result in a decrease in the local and regional population of 364 persons (0.07 percent) due to the net loss of 161 military and civilian positions. This anticipated population loss includes military personnel and family members directly impacted, and a portion of civilian personnel anticipated to relocate outside the Base.

Housing

It is anticipated that approximately 175 housing units would become vacant with the loss of military and civilian personnel, with the majority being housing occupied by military personnel and family members. The 175 housing units equate to 0.1 percent of the 183,067 units in the Vallejo-Fairfield-Napa PMSA. Based upon the current on-Base and off-Base distribution of military personnel occupied housing, approximately one-half of these units would consist of on-Base housing and one-half off-Base housing. The Cities of Vacaville and Fairfield would be expected to experience the most housing vacancies based on the present distribution of off-Base housing units occupied by military personnel.

Education

The net loss of the military and civilian population expected from the Proposed Action would result in a decrease in local school district enrollments. Assuming a factor of 0.75 school age children per military household, there would be an enrollment decrease of approximately 112 military dependent children in addition to a small number of children from the affected civilian households who are assumed to relocate. It is anticipated that the 2.2 percent decrease in school enrollments would occur within the TUSD based on the current enrollment distribution of military dependent children.

Economy

Direct and indirect short-term beneficial economic impacts would be realized by the regional and local economy during the construction phase of the Proposed Action, while minor adverse long-term economic impacts would be expected to result after construction is completed. Employment generated by construction activities would result in wages paid, and expenditures for local and regional services and supplies. However, the loss of military and civilian employees as a result of subsequent loss of 161 personnel authorizations under the Proposed Action would result in a loss in wages paid, business sales and income to the local and regional economy.

The EIFS model developed by the U.S. Army Construction Engineering and Research Laboratory was used to assess the impacts of the Proposed Action on population, housing, education and the economy. The EIFS model was used to project the short-term regional economic impacts of project construction, and the long-term economic impacts associated with project operations. The EIFS model provides a systematic method for evaluating the regional socioeconomic effects of government actions, particularly military actions.

The estimated construction cost (capital costs) for project implementation and annual average income for construction laborers were the inputs used in the execution of the EIFS construction model. The estimated construction cost is approximately $124 million over a 4-year period. The ROI is considered to be Solano, Napa, Yolo, Sacramento and Contra Costa Counties.

Using employment and income multipliers developed with a comprehensive regional/local database combined with economic export base techniques, the EIFS model estimates the regional economic impacts with respect to changes in employment generated, and expenditures directly and indirectly resulting from project construction. The EIFS model evaluates economic impacts in terms of regional change in sales (business) volume, employment and personal income. Since the economic projections generated by the EIFS model are on an annual basis, the primary model input for construction costs ($124.1 million) was pro-rated over an estimated 4-year construction period. As indicated in Table 4.3.7-1, the direct annual regional economic impacts of project construction over this 4-year period consist of increases of $31,025,000 business volume (sales); 167 jobs in the construction, retail trade, services and industrial sectors; and, $4,173,330 in direct personal income. The latter value represents the earnings of employees in the retail, wholesale and service establishments that are initially or directed affected by the construction activity, and does not include the construction employment directly involved in project construction. The increase in business volume reflects increases in the sales of goods, services and supplies associated with project construction activity.

Table 4.3.7-1 EFIS Annual Economic Impacts, Travis AFB

	Direct Impacts	Indirect Impacts	Total
Construction			
Sales (Business) Volume	$31,025,000	$89,662,250	$120,687,250
Income	$4,173,330	$12,060,930	$16,234,260
Employment	167	481	648
Operations			
Sales (Business) Volume	-$2,602,001	-$7,519,782	-$10,121,783
Income	-$6,137,225	-$1,011,524	-$7,148,749
Employment	-175	-40	-215

Source: U.S. Army Construction Engineering Research Laboratory 1999

Table 4.3.7-1 also portrays the indirect annual regional impacts on secondary sales, employment and income generated by the employment and business activity directly associated with project construction. The direct increase in sales and employment generates secondary sales of $89,662,250; creates an additional 481 jobs indirectly in the retail trade, services and industry sectors; and results in an additional $12,060,930 in indirect income. Income is indirectly impacted as a result of the indirect increase in sales and employment resulting from the initial economic impacts.

Long-term adverse economic benefits of the Proposed Action would be realized as a result of the loss of 161 military and civilian employees during operations. The primary inputs for the EIFS operations model are a decrease in estimated annual operating expenditures ($1,000,000); estimated loss of military and civilian employees (161); and, annual average incomes of $37,900 and $40,255, respectively, for military and civilian employees being displaced.

As indicated in Table 4.3.7-1, the direct annual regional economic impacts as a result of a decrease of 161 employees consist of a loss to the regional economy of $2,602,001 in business volume (sales); 175 jobs in the government, retail trade, services and industrial sectors; and $6,137,225 in direct personal income. The latter represents the earnings of employees in the retail, wholesale and service establishments that are initially or directed affected by the net loss of military and civilian employees. The decrease in business volume reflects decreases in the sales of goods, services and supplies to the military and civilian personnel associated with project operations.

Table 4.3.7-1 also portrays the indirect annual regional impacts on secondary sales, employment and income generated by the employment and business activity directly associated with operations. The direct decrease in sales and employment generates: losses in secondary sales of $7,519,782; the loss of an additional 40 jobs indirectly in the retail trade, services and industry sectors; and, a loss of an additional $1,011,524 in indirect income. Income is indirectly impacted as a result of the decrease in sales and employment resulting from the initial economic impacts.

The EIFS model also includes an RTV profile that is used in conjunction with the forecast models to assess the significance of impacts of an activity for a specific geographic

area. For each variable (sales volume, employment, income and population), the current time-series data available from the USDOC Bureau of Economic Analysis (USDOC 2000, 2001) are calculated along with the annual change, deviation from the average annual change, and the percent deviation for each of these variables, which then defines a threshold for significant annual regional economic impacts for a variable. Within the EIFS model, the RTV is also calculated for each of these variables when assessing the regional economic impacts of a specific project. If the RTV for a particular variable associated with the impacts of a specific project exceeds the annual regional RTV for that variable, then the economic impacts are considered to be significant. If the RTV for a variable is less than the regional RTV for that variable, then the regional economic impacts are not considered significant. With respect to the EIFS model assessment of the economic impacts of construction and decrease in operations-related personnel, the RTVs for each of the four variables (population, sales volume, income, employment) were found to be less than the regional RTVs. For this reason, short-term project construction and the long-term decrease in military and civilian personnel associated with the Proposed Action would not be expected to result in significant annual regional economic impacts.

4.3.7.2 Mitigation

No significant population, housing, education, or economic impacts would be anticipated. Therefore, no mitigation would be required.

4.3.7.3 Cumulative Impacts

There would be an increase of 206 personnel authorizations at Travis AFB under the other actions, and a decrease of 161 personnel as a result of the Proposed Action. Additionally, 18 facilities projects would be constructed under the other actions during the same period as the 16 Proposed Action projects. Table 4.3.7-2 presents cumulative impacts to population, housing, and education, and Table 4.3.7-3 summarizes the economic impacts of the cumulative condition.

Table 4.3.7-2 Cumulative Population, Housing, and Education Impacts, Travis AFB

Category	Proposed Action	Other Actions	Cumulative Condition	Percent Change
Population (persons)	-364	+466	+102	0.02 percent of Vallejo-Fairfield-Napa PMSA population
Housing (units)	-175	+224	+49	0.03 percent of Vallejo-Fairfield-Napa PMSA housing units
Education (students)	-112	+143	+31	0.61 percent of TUSD students

Table 4.3.7-3 Cumulative Economic Impacts, Travis AFB

	Direct Impacts	Indirect Impacts	Total
Construction			
Sales (Business) Volume			
Other Action Emissions[b]	0.700	0.219	3.219
Proposed Action Emissions[b]	0.749	0.234	3.442
Total Construction Emissions	1.449	0.453	6.661
Construction Emissions as Percent of AQCR Emissions			
Other Action Emissions[b]	0.700	0.219	3.219
Proposed Action Emissions[b]	0.749	0.234	3.442
Total Construction Emissions	1.449	0.453	6.661
Construction Emissions as Percent of AQCR Emissions			
Other Action Emissions[b]	0.700	0.219	3.219
Proposed Action Emissions[b]	0.749	0.234	3.442
Total Construction Emissions	1.449	0.453	6.661
Operations			
Sales (Business) Volume			
Other Actions	$3,329,268	$9,621,584	$12,950,852
Proposed Action	-$2,602,001	-$7,519,782	-$10,121,783
Cumulative Impact	$727,267	$2,101,802	$2,829,069
Income			
Other Actions	$7,852,598	$1,294,248	$9,146,846
Proposed Action	-$6,137,225	-$1,011,524	-$7,148,749
Cumulative Impact	$1,715,373	$282,724	$1,998,097
Employment			
Other Actions	224	51	275
Proposed Action	-175	-40	-215
Cumulative Impact	49	4	60

As indicated in Table 4.3.7-2, population within the Vallejo-Fairfield-Napa PMSA would increase by 10 persons, 49 additional housing units would be needed in the PMSA, and an additional 31 would attend the TUSD. The greatest increase for any of these categories for the Proposed Action cumulative condition when compared to the baseline condition would be 0.61 percent for the number of students in the TUSD.

With respect to the EIFS model assessment of the economic impacts of construction and increase of 45 operations-related personnel, the RTVs for each of the four variables (population, sales volume, income, employment) were found to be less than regional RTVs. For this reason, short-term project construction and the long-term increase in military and civilian personnel associated with the Proposed Action cumulative condition would not be expected to result in significant annual regional economic impacts.

4.3.8 Cultural Resources

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NHRP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but would not be limited to:

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; and
- transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the integrity of that cultural resource, resulting in - alteration or destruction of those characteristics or qualities which make it significant and potentially eligible for inclusion in the NRHP. While archaeological sites or historic buildings or structures can be destroyed during a single event, more often it is the cumulative effect of recurrent disturbing actions that diminish the integrity of the cultural resource and its significant characteristics.

No supersonic flight or supersonic events would occur as a result of the Proposed Action. Alterations to extant structures are necessary to accommodate the C-17 aircraft. Therefore, activities with potential to adversely affect cultural resources would be potential aircraft crashes, alterations and/or modifications to significant historic structures, and noise. A discussion of the current level of information relating to the ways in which noise could affect cultural resources is provided in the following paragraphs.

PL 100-91, passed in August 1987, directed the U.S. Forest Service and the NPS to conduct studies and make recommendations to Congress on aircraft overflight that may be affecting either visitors or resources of the National Forest System and National Parks. Completed in July 1992, this cooperative study (USDA 1992) concluded the following:

- Because many cultural resources are located in remote and uninhabited areas, documented observations of aircraft noise effects are rare; and

- Most of the available literature relates to research by the Air Force, National Aeronautics and Space Administration, and the FAA and has focused on the effects of sonic booms.

A recently developed prediction method places a definite risk of damage to prehistoric structures (*e.g.*, rock art, rock alignments, rock cairns) from low overflight of heavy bombers and heavy helicopters; however, measurement programs have been conducted which conclude that there is minimal risk of damage to structures from light, low-flying subsonic jet aircraft and light helicopters.

Some evidence exists that long-term effects of noise exposure could result in damage by initiating or accelerating the deterioration process, especially to already fragile resources. Long-term effects appear as (1) fatigue effects in walls and other structural elements after extensive exposure, (2) moisture damage initiated by cosmetic cracks in exterior surfaces, and (3) gradual erosion of surface materials (*e.g.,* adobe mud-plastered walls) from repeated events.

A study that examined noise effects of low-level B-52 overflights on Long House, a 1,000-year old Arizona adobe, concluded that noise from a B-52 aircraft would have no significant effects. Noise levels generated by the B-52 aircraft during this study were as high as 113 dBA. Noise-induced landslides and rockfalls are less probable (less than 0.001 percent probability), so by inference, rock alignments and cairns are unlikely to be disturbed. Based on these data, noise impacts to prehistoric, historic and architectural resources are not expected as a result of low-level subsonic aircraft overflight. In addition, the maximum sound pressure generated by the C-17 (100-dBA at 300-feet AGL) on the MTRs would be less than the 113-dBA generated by B-52 aircraft in the study (USAF 1997).

Effects of aircraft accidents on cultural resources are unpredictable. There are two potential ways for aircraft accidents to affect cultural resources. These are: (1) aircraft crashing onto or into and damaging sites; and (2) personnel and vehicles in the process of retrieving falling objects driving over or otherwise damaging cultural resources. However, the occurrence of aircraft accidents is statistically low. There is only a small probability that potential historic properties might be affected by aircraft accidents.

For this analysis, the ROI is synonymous with the area of potential effect, as defined by the NHPA. The ROI is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.

4.3.8.1 Travis AFB

Archaeological Resources

No NRHP-eligible archaeological resources are located within or adjacent to the ROI for Travis AFB. The Proposed Action would not result in any effects to archaeological resources on Travis AFB.

In the event previously undetected archaeological resources or human remains are discovered during project activities, the construction contractor or responsible individual would be required to stop construction activities in the affected area (and a reasonable buffer exclusionary area) and contact the 60 CES/CEV Cultural/Natural Resources Manager, who will take steps to minimize impacts to the resource. Procedures to follow must be in accordance with Section 5.5.1 (*Inadvertent Discovery of Archaeological Remains*) of the ICRMP for Travis AFB. Any unknown site or other cultural remains inadvertently discovered must be assumed to be potentially eligible for NRHP listing. The 60 CES/CEV Cultural/Natural Resources Manager would then notify the Installation Commander about the nature, location, and circumstances of the discovery. Where no human remains are involved, the 60 CES/CEV Cultural/Natural Resources Manager shall notify the NPS, SHPO, and Advisory Council on Historic Preservation in accordance with Section 5.5.1 of the ICRMP. In the event further investigation is required, any data recovery would be performed in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 Federal Register 44734-37) and take into account the Council's publication, *Treatment of Archaeological Properties*. This process applies to archaeological resources under all elements of the Proposed Action.

Historical Resources

Two NRHP-eligible historical resources are located within or adjacent to the ROI for Travis AFB:

- Proposed additions and alterations to the Life Support Facility/Armory would result in potential renovations to Bldg. 1212, the former Unit A Rocket Checkout/Assembly building, which is a part of the proposed ADC Readiness Area Historic District.
- Proposed construction of the C-17 Tire and Wheel Shop would occur adjacent to Bldg. 810, a Cold War Era aircraft hangar built in 1951.

To avoid impacts to historical resources, the Air Force would ensure that alteration of Bldg. 1212 and design and construction of the proposed C-17 Tire and Wheel Shop is conducted to protect architectural features and physical condition of these historic structures. As stipulated in the Draft Memorandum of Agreement and Draft Programmatic Agreement for operation, maintenance, and development undertakings at Travis AFB, any additions to historic properties shall be designed to be compatible with the historic and architectural qualities of the buildings in terms of scale, massing, color, and materials. Any such additions would be responsive to the recommended approaches to new construction set forth in the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67.7). The design and specifications for the project shall be developed in consultation with the California SHPO and submitted to the California SHPO for approval. Protection of this historic resource from deterioration or damage would be carried out in accordance with specific standards provided in 36 CFR 68.4. In addition, the Air Force would incorporate specific requirements identified during the Section 106 consultation process with the California SHPO for this undertaking. With incorporation of these measures, the Proposed Action would not be expected to result in adverse effects on historical resources on Travis AFB.

Native American Interests

No traditional cultural properties or other Native American interests have been identified within or immediately adjacent to the ROI for Travis AFB. A list of federally recognized Native American tribes and groups identified at time of preparation of this document is presented in Table 3.1.8-6. The Air Force consulted with these entities pursuant to 36 CFR 800.2 (see Appendix C).

4.3.8.2 Military Training Routes

Archaeological Resources

Approximately 110 NRHP-listed archaeological resources were identified within the MTR corridors (see Table 3.1.8-2). The only potential impacts to archaeological resources as a result of operation of the Proposed Action MTRs would be from noise. As discussed in Subchapter 4.3.8.1, noise from C-17 operations would have no effect on archaeological resources.

Historical Resources

Approximately 1,279 NRHP-listed historical resources (including historic districts) were identified within the MTR corridors (see Table 3.1.8-3). The only potential impacts to historical resources as a result of operation on the Proposed Action MTRs would be from noise. As discussed in Subchapter 4.3.8.1, noise generated by C-17 operations would have no effect on historical resources.

Native American Interests

A list of federally recognized Native American tribes and groups identified at the time of preparation of this document is contained in Table 3.1.8-6. The Air Force consulted with these entities pursuant to 36 CFR 800.2 (see Appendix C) and replied to four responses from Native American groups concerning the proximity of their reservations to MTRs (see Appendix C). As a result of the response from the Karuk Tribe of California and subsequent consultation, the Air Force coordinated with the Navy as the MTR originating/scheduling activity to establish overflight avoidance areas of 3 miles and not lower than 1,500 feet AGL for two sites along VR-1250 where sacred ceremonies are conducted in the summer months. The other three responses were resolved by the Air Force's answer.

4.3.8.3 Mitigation

No significant archaeological and historical resources or Native American effects have been identified. Therefore, no mitigation measures would be required.

4.3.8.4 Cumulative Impacts

As with the Proposed Action, no NRHP-eligible archaeological or historical resources occur within the ROI for the other actions. The consultation process with Native American interests would include the other action sites. Thus, when combining the other actions with

the Proposed Action, no cumulative adverse cultural resources effects, including visual, would be anticipated under the cumulative condition.

4.3.9 Land Use

This Subchapter presents an analysis of the potential impacts on land use for Travis AFB, adjacent to the Base, and areas under the MTRs. An impact to land use would be considered significant if one or more of the following occur as a result of the proposed action: (1) conflict with applicable ordinances and/or permit requirements; (2) nonconformance with applicable land use plans; (3) preclusion of adjacent or nearby properties being used for existing activities; or (4) conflict with established uses of an area.

4.3.9.1 Travis AFB

On-Base land use conflicts would not be expected under the Proposed Action. Most land uses would be compatible with the general character of existing and planned Base land use patterns. The Travis AFB General Plan incorporated mission beddown scenarios such as the Proposed Action in the future land use and future development components of the General Plan. Thus, facility construction anticipated under the C-17 beddown would be consistent with existing and future land use plans and programs identified in the General Plan. Facility construction and alteration activities may have a temporary minor constraint on existing operations and land uses; however, after construction, these facilities would not be expected to impact any adjacent land use.

The Proposed Action would decrease the noise contours when compared to baseline conditions, and no additional areas would be exposed to higher noise levels. The landfill located in the southwest APZ I would continue to be incompatible with AICUZ recommendations. There would be no change to the dimensions of current CZs or APZs at Travis AFB. No additional land use incompatibilities would be anticipated under the Proposed Action.

4.3.9.2 Military Training Routes

Lands below the MTRs were reviewed to determine if increased aircraft noise or additional MTR operations would affect land uses. Sensitive land uses (*e.g.*, wildlife management areas, parks, residential) would be exposed to increased noise levels between L_{dnmr} 36 and 62 dBA. However, the maximum increase on any route would be L_{dnmr} 4 dBA (VR-1252 only). There would be no increase in noise on the route that had the highest noise under the baseline (VR-201, L_{dnmr} 62 dBA). These resultant noise levels would be below the DNL noise/land use compatibility guidelines synopsized in Table 3.1.9-1. There are numerous recreational/wilderness areas below the MTRs (see Subchapter 3.1.9) where visitors may be annoyed by aircraft overflight. However, based on the sensitive land uses, exposed noise levels and consideration of the noise and overflight studies described in Subchapter 3.1.3, no significant impacts to sensitive land uses would be anticipated due to the slight increase in noise levels or additional overflights from the proposed operations. No impacts to land ownership or the existing function of the sensitive land uses would occur.

4.3.9.3 Mitigation

No significant land use impacts would occur as a result of the Proposed Action. Therefore, no mitigative actions would be required. The local planning agencies could use the noise contours for future land use planning and zoning

4.3.9.4 Cumulative Impacts

Under the cumulative condition, other facilities would be constructed on Travis AFB and some would be in the general area associated with C-17 basing activities. As with the Proposed Action facilities, the other facility actions would be compatible with the Travis AFB General Plan. Thus, the facility construction anticipated under the cumulative condition would be consistent with existing and future land use plans and programs identified in the General Plan.

4.3.10 Infrastructure and Utilities

Impacts to the infrastructure and utility systems would be considered significant if the federal action substantially increased the demands on systems, resulting in the need for additional capacity or new facilities.

4.3.10.1 Travis AFB

Water Supply

Under the Proposed Action, there would be a net loss of 161 Air Force active duty, reserve, and civilian personnel, decreasing the Base workforce to 14,196 persons. Based on the amount of water that was used in FY 01, the water treatment plant was operating at about 48 percent of the system's capacity (2.87 mgd/6.0 mgd). The average daily per capita consumption for CY 2001 was approximately 200 gal/day (2.87 mgd/14,357 people). Assuming the same consumption rate, there would be a net reduction of about 32,200 gallons of water per day used as a result of the Proposed Action. This represents a 1.1 percent reduction when compared to the baseline condition.

In addition to personal use, up to 0.0035 mgd of water per acre may be required for dust control during demolition, construction, and renovation. This water would be supplied by the Base water system. It is estimated dust control water application would occur approximately 115 days per year and that an average of 27.8 acres (1,210,758 square feet / 43,560 square feet per acre) would be disturbed during the duration of the project. About 0.1 mgd of water would be applied for dust control 115 days per year. Use of 0.1 mgd of water for dust control equates to about 1.6 percent of system capacity. Use of water for dust suppression would end when the demolition and construction activities are completed.

Wastewater Treatment

Under the Proposed Action, there would be a net loss of 161 Air Force active duty, reserve, and civilian personnel, decreasing the Base workforce to 14,196 persons. The average per capita generation of wastewater for FY01 was about 113 gal/day (1.62 mgd/14,357 people). Assuming the same generation rate, there would be a net reduction of about 18,193 gallons of wastewater produced per day as a result of the Proposed Action. This represents a 1.2 percent reduction when compared to the baseline condition.

Storm Water Management

All proposed demolition, construction, and renovation activities would occur within the existing boundaries of the Base. The amount of impervious cover on the Base is approximately 1,976 acres (86,074,560 square feet). The amount of impervious cover would increase by 1,210,758 square feet (27.8 acres), which represents about 1.4 percent increase over baseline conditions. Therefore, the amount of storm water runoff should not increase significantly above the existing conditions. The curbs and gutters installed during any street and off-street parking construction would be connected to the existing storm water system to channel runoff to the Main channel near the southwest corner of the Base. If required, a new storm water system or connections would be designed and constructed to comply with current regulations and to accommodate any storm water flow increases. Since the amount of disturbed area is greater than 1 acre, a storm water permit for construction activities would be required. The various construction projects will comply with the requirements of the new storm water permit being coordinated by Travis AFB.

The contractor would ensure a SWPPP is completed and approved before initiating activities. The plan likely would include the erosion control techniques that would be used during demolition and construction to minimize erosion. The construction sites would have silt fences and other erosion control features such as absorbent booms for oils and greases down gradient. Hay bales or other absorbent materials would be installed around storm drainage system inlets to prevent sediment or other contaminants from entering the storm water system during the project. The rate of runoff from the construction site would be retarded and controlled mechanically. Diversion ditches would be constructed to retard and divert runoff to protected drainage courses. If site characteristics present the potential for storm water sediment to enter the storm water system, drains in the area would be protected with silt fences, hay bales, or an approved equivalent. No significant storm water management impacts would be anticipated from project site runoff.

Energy

Implementation of the Proposed Action would result in a slight increase in the demand for energy after the basing action is complete. As a result of the Proposed Action, an additional 360,758 square feet of buildings would be constructed and electricity and natural gas use would increase by 12,416 kWH (360,758 square feet x 0.0344 kWH per square foot) and 23,810 BTUs (360,758 square feet x 0.066 BTUs per square foot), respectively. The net increase represents 0.01 percent of the baseline conditions. The energy system's capacity is more than adequate to handle the increases as a result of the proposed new buildings.

Solid Waste Management

In considering the basis for evaluating the significance of impacts on solid waste, several items were considered. These items include evaluating the degree to which the Proposed Action waste generation could affect the existing solid waste management program and the capacity of the area landfill. Analysis of the impacts associated with the proposed demolition and construction activities is based on the following assumptions:

- The weight of concrete debris is 150 lb/ft^3 (Merritt 1976);
- The weight of asphaltic concrete roadways is 130 lb/ft^3 (AI 1983);
- Approximately 4 pounds of construction debris is generated for each square foot of floor area for new structures (Davis 1995);
- Approximately 92 pounds of demolition debris is generated for each square foot of floor area of demolished structures (USACE 1976);
- Approximately 96 pounds of demolition and construction debris are generated for each square foot of floor area of renovated structures;
- Approximately 1 pound of construction debris is generated for each square foot of new asphaltic concrete pavement;

Under the Proposed Action, there would be an estimated 161 fewer personnel residing or working on Base. Thus, there would be a reduction in solid waste generated by Air Force active duty, reserve, and civilian personnel. Thus, there would be net positive change in residential solid waste under the Proposed Action, and the deposition in the landfill would continue at the same rate as the baseline condition.

Type IV solid waste would be generated from implementation of the Proposed Action. These wastes would consist of building debris and construction materials such as concrete, metals (roofing, reinforcement bars, conduit, piping, *etc*.), fiberglass (roofing materials and insulation), cardboard, plastics (PVC piping, packaging material, shrink wrap, *etc*.), and lumber. Based on information in Subchapter 2.4.2.2 and estimations, 356,958 square feet would be constructed and 3,800 square feet would be renovated. Additionally, 850,000 square feet of new roadways would be constructed. Based on these data and the assumptions listed above, it is estimated that 1,321 tons of demolition and construction debris would be generated by the Proposed Action.

It is assumed the debris would be disposed in the Potrero Hill Landfill. Disposal of demolition, construction, and renovation debris from the Proposed Action would increase the disposal rate at the Potrero Hill Landfill by approximately 2.4 tons per day over the 25-month period. This rate is conservative and reflects that all waste would be disposed in a landfill. It is assumed the contractor would recycle materials to the maximum extent possible, thereby reducing the amount of construction and demolition debris disposed in the landfill. However, the exact amount of debris cannot be estimated at this time and this analysis assessed the most conservative condition.

As mentioned in Subchapter 3.1.10.5, the landfill has a remaining projected life expectancy of 54 years, with an average disposal rate of 2,192 tons per day. Based on an average disposal of 260 days per year (*i.e.*, 5 days per week) for 54 years, there would be 14,040 days when construction and demolition debris would be disposed in the landfill. Thus, the total remaining capacity of the landfill is estimated at 30,776,000 tons. The projected disposal from the project (1,321 tons) equates to less than 0.004 percent of the total remaining capacity. Disposal of construction and demolition debris from the Proposed Action would not significantly reduce the life expectancy of the landfill.

Transportation Systems

Impacts would include a temporary increase in construction-related traffic during the construction activities. It is anticipated construction-related traffic would be localized to the specific construction project area as well as the route between the project site and the Base gate. The construction-related traffic would be temporary, lasting as long as the project activity in that area. One of the construction projects would realign a portion of Ragsdale Street. Traffic flow in the Ragsdale Street/Hamstead Street vicinity should improve after the construction activities are complete due to the improved layout of the local streets. The net loss of 161 Air Force active duty, reserve, and civilian personnel (1 percent) would result in a very slight decrease in weekday on-Base roadway volumes. It is anticipated that vehicular traffic at the Base gates would be acceptable, with no substantial change in volumes from baseline conditions. No substantial change in traffic congestion would be expected as a result of the Proposed Action, and the Proposed Action would only lessen and not worsen congestion.

4.3.10.2 Mitigation

No significant impacts would be anticipated. Therefore, no mitigation would be required.

4.3.10.3 Cumulative Impacts

Water Supply

When combining the net increase in personnel from the other actions (206 persons) with the net loss of personnel under the Proposed Action (161 persons), there would be a net increase of 45 personnel (less than 1 percent) at Travis AFB. The net increase of 45 Air Force active duty, reserve, and civilian personnel would increase the Base workforce to 14,402 persons. Assuming a consumption rate of 200 gal/day per person, there would be a net increase of about 9,000 gallons of water per day used as a result of the Proposed Action cumulative condition. This represents a 0.3 percent increase when compared to the baseline condition.

Construction projects associated with the other actions would increase project-related water use as described for the Proposed Action. It is estimated dust control water application would occur approximately 115 days per year and that an average of approximately 473. acres (3,197,366 square feet / 43,560 square feet per acre) would be disturbed during the duration

of the project. About 0.25 mgd of water would be applied for dust control 115 days per year. Use of 0.25 mgd of water for dust control equates to about 4 percent of system capacity. Use of water for dust suppression would end when the demolition and construction activities are completed.

Wastewater Treatment

Similar to the Proposed Action, there would be a net increase of 45 personnel (less than 1 percent of the Base population) at Travis AFB. The net increase of 45 personnel would increase the Base workforce to 14,402 persons. Assuming a generation rate of 113 gal/day per person, there would be a net increase of about 5,085 gallons of water per day used as a result of the Proposed Action cumulative condition. This represents a 0.3 percent increase when compared to the baseline condition.

Storm Water Management

There would be an overall increase in impervious cover which would result in an increase in impervious cover from the Proposed Actions and other actions. The amount of impervious cover would increase by 1,505,771 square feet 36.4 acres), which represents about 1.8 percent increase over baseline conditions. Three projects (a roadway relocation project for the Proposed Action and a parking apron improvement and the Travis Avenue repaving projects for other actions) are not included in the calculations since these areas would not be considered new impervious areas. Discussion for the Proposed Action would apply to the other facilities sites. With implementation of control devices, no cumulative significant storm water impacts would be anticipated from implementation of the Proposed Action and other actions.

Energy

Eighteen facilities would be constructed under the other actions and four of the facilities they replace would be demolished. Cumulative actions would result in a slight increase in the demand for energy after the Proposed Action and other action facilities projects are completed. The net amount of building space to be constructed is 333,425 square feet (522,011 square feet of new facilities – 188,586 square feet of demolished buildings). The amount of electricity and natural gas use would increase by 11,470 kWH (333,425 square feet x 0.0344 kWH per square foot) and 22,006 BTUs (333,425 square feet x 0.066 BTUs per square foot), respectively. The net increase represents 0.008 percent when compared to the baseline conditions. The energy system's capacity is more than adequate to handle increases from implementation of the Proposed Action and other actions.

Solid Waste Management

Based on the information in Subchapter 2.5.1, a total of about 3,197,366 square feet of facility space would be constructed under other actions, and 188,586 square feet would be demolished. Based on these data and the assumptions listed in Subchapter 4.3.10.1, it is estimated that 7,745 tons of debris would be generated by the other actions. Disposal of demolition, construction, and renovation debris from the other actions would increase the

disposal rate at the Potrero Hill Landfill by an average 14.3 tons per day over the 30-month period. It is assumed the contractor would recycle materials to the maximum extent possible, thereby reducing the amount of construction and demolition debris disposed in the landfill. However, the exact amount of debris cannot be estimated at this time and this analysis assessed the most conservative condition.

The landfill has a remaining projected life expectancy of 54 years, with an average disposal rate of 2,192 tons per day. Based on an average disposal of 260 days per year (*i.e.*, 5 days per week) for 54 years, there would be 14,040 days when construction and demolition debris would be disposed in the landfill. Thus, the total remaining capacity of the landfill is estimated at 30,776,000 tons. The projected disposal from the Proposed Action cumulative condition (7,745 plus 1,321 equals 9,066 tons) equates to 0.03 percent of the total remaining capacity. Disposal of construction and demolition debris from the Proposed Action and other actions would not significantly reduce the life expectancy of the landfill.

Transportation

Construction projects associated with the other actions would increase project-related traffic as described for the Proposed Action. Since some of the other actions are in the same area as the Proposed Action construction activities, there could be a slight cumulative increase in traffic. As with the Proposed Action, the construction-related traffic would be temporary, lasting as long as the project activity in that area. When combining the net increase in personnel from the other actions (206 persons) with the net loss of personnel under the Proposed Action (161 persons), there would be a net increase of 45 personnel (less than 1 percent) at Travis AFB. This would result in a very slight increase (estimated to be less than 1 percent) in weekday on-Base roadway volumes. It is anticipated that vehicular traffic at the Base gates would be acceptable, with no substantial change in volumes from baseline conditions. No substantial change in traffic congestion would be expected as a result of the cumulative condition.

4.3.11 Airspace and Airfield Operations

Impacts are assessed by comparing projected military flight operations and proposed airspace utilization with baseline conditions, to include civil aviation activities. This assessment includes analyzing the capability of the affected airspace elements to accommodate the projected level of military and civil flight activities, and determining whether such changes would have an adverse impact on overall use of the airspace. This includes consideration of such factors as the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace; possible impacts on other nonparticipating civil and military aircraft operations; and possible impacts on civil airports underlying or near the airspace projected for use in the Proposed Action.

4.3.11.1 Travis AFB

Airspace Operations

Given the size and operating similarities (airspeed, flight profiles) of the C-17, C-5, and KC-10 aircraft, the type of sortie aircraft operations and airspace requirements associated with the Proposed Action would be consistent with the baseline operations. The number of annual operations associated with Travis AFB within the airspace would increase slightly from a baseline of about 17,250-operations to 17,298-operations. However, the daily average would remain about 47-operations per day. The existing air traffic control procedures and airspace infrastructure surrounding Travis AFB have the capability to accommodate the anticipated operations. The low altitude federal airways and MTRs that transit ROI airspace would not be impacted, nor would they affect, the increased level of operations in the airspace.

Airfield Operations

Under the Proposed Action, average daily airfield operations at Travis AFB would decrease by 12.67-operations from 242.81 to 230.14 operations (see Tables 2.4.1-1 and 2.4.2-1, respectively). The airfield has the capacity to accommodate the anticipated level of operations. The operating characteristics of the C-17 are similar to the C-5 and KC-10. Thus, the existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, would accommodate C-17 operations at Travis AFB.

4.3.11.2 Military Training Routes

Under the Proposed Action, individual route use by all aircraft types would range from as few as two operations on IRs-212 and 236, VR-1252, and SR-381 to as many as 32 monthly operations on SR-300/301 (see Table 4.3.3-7).

None of the 19 MTRs would require modification to support C-17 operations. Thus, there would be no need to change to the specific data for any route in Appendix B. However, as stated in the footnotes of Table 2.4.2-2, Travis AFB intends to request the unit that originates/schedules SR-300/301 to redesignate the route as an IR or VR so the route can be flown at airspeeds greater than 250 knots and at altitudes above 1,500 feet AGL to increase training realism. With redesignation of the SRs as either IRs or VRs, the routes would be published on aeronautical charts that are available to all military and civil pilots. Publication of the routes would increase awareness of the existence of the routes to more pilots than is currently available. SRs are not published on aeronautical charts other than some charts used by military pilots.

Several conditions reduce the potential "competition" for the same airspace at intersecting points by aircraft on an airway and aircraft on an MTR. The airway can be flown under both VFR and IFR conditions, as can an IR. Under IFR conditions, aircraft are radar identified and controlled by air traffic control, and the pilots maintain radio communication with air traffic control agencies, thereby improving aircraft separation conditions. When flying in visual meteorological conditions, pilots use the "see and avoid" concept. A VR is

flown only under VFR conditions. Therefore, potential for conflict between aircraft during VFR conditions is greater than for IFR because aircraft are not necessarily radar identified. However, VFR conditions provide a better opportunity for pilots to "see and avoid" each other. Additionally, aircraft on airways and aircraft on the MTR monitor common air traffic control frequencies for air traffic advisories and guard frequencies for emergency notification. Air traffic control personnel monitor aircraft directly by radar monitoring and communication with aircraft through periodic receipt of aircraft position through position reporting. Position reporting and traffic advisories, combined with visual contact between pilots and radar control of aircraft, reduce the potential for two aircraft at the same altitude, at the same point, at the same time. Given the conditions mentioned in this paragraph, the probability would be very low that an aircraft on an airway and an aircraft on a MTR or transition corridor would be at the same altitude at the same position.

As indicated in Appendix B, some MTRs could penetrate airspace associated with instrument approaches at airports along the routes. Operating procedures direct aircrews flying an MTR to contact the air traffic control tower associated with the airport for traffic advisories and route alteration, if necessary, to avoid other traffic. Additionally, directives request that aircraft on an MTR avoid airports by 3 NMs and 1,500 feet AGL where practicable. Continuation of these procedures would assist Travis AFB C-17 aircrews to deconflict operations with aircraft executing an instrument approach to an airport along the route.

In summary, each MTR has the capacity to accommodate the additional operations associated with the Proposed Action and the structure for each route can support C-17 operations. The potential for conflict between aircraft operating on the MTRs as well as other civil aircraft operating in the airspace around the MTRs is low because the existing scheduling and air traffic control procedures are designed to deconflict aircraft. The proposed MTR operations would not place significant demands on, nor impact, the airspace infrastructure.

4.3.11.3 Aircraft Safety

It is impossible to predict the precise location of an aircraft accident. However, aircraft flight tracks are developed to avoid overflying residences and built-up areas to the maximum extent practicable. As mentioned in Chapter 3, 68 percent of the Air Force aircraft accidents that occur within a 10-NM radius of an airfield happen either on the airfield or within an area that is 3,000 feet wide and extends out to a distance of 15,000 feet from the end of the runway. Historical data show that large aircraft such as the C-17, C-5, and KC-10 would have lower probability of being involved in an accident within the 10-NM radius (20 percent) when compared to fighter and trainer aircraft (80 percent). The types of landing and takeoff operations the C-17, C-5, and KC-10 aircraft would accomplish at Travis AFB, as well as MTR operations (C-17 only), would be consistent with those flown over the lifetime for each aircraft. Thus, it is anticipated the mishap distribution discussed in Subchapter 3.1.11.3 for takeoffs and landings, as well as the baseline class A mishap rates for all phases of flight (see Tables 3.1.11-2 and 3.2.11-3), would apply to the operations anticipated under the Proposed Action. For these

reasons, the probability is low that an aircraft involved in an accident at or around the Travis AFB airfield or on a MTR would strike a person or structure on the ground.

4.3.11.4 Bird-Aircraft Strike Hazard

Bird-aircraft strike hazards can be assessed using a combination of bird distribution and behavior factors and aircraft operational factors. Some of these factors include:

- The size and behavior of the predominant bird species;
- The presence of specialized habitat or location that favors migration patterns or large concentrations of birds;
- The frequency and location of takeoffs and landings;
- The altitude of flight operations; and
- The flight characteristics of the aircraft, including size, airspeed, and number of engines.

Overall, it is estimated the total flying hours for Travis AFB's three aircraft types (C-17, C-5, and KC-10) within the ROI airspace would decrease under the Proposed Action by about 3 percent when compared to the baseline. Thus, bird-aircraft strikes associated with airfield operations at Travis AFB would be expected to decrease commensurate with the change in flying hours. Based on the 2002 data in Table 3.1.11-3, it is estimated that 81 bird-aircraft strikes would occur for a 1-year period when applying the reduction in flying time. However, when considering the 10-year average data, the number of annual strikes could be as high as 327 strikes.

Travis AFB aircrews flew no MTR operations under the baseline condition and the baseline bird-aircraft strike data for the operations that occurred on the routes proposed for use by Travis AFB are not available. Thus, there is no statistical data for use in estimating bird-aircraft strikes for the Proposed Action MTR operations. Air Force-wide, 5,902 bird-aircraft strikes occurred during MTR operations in 2002 (USAF 2003e) during at total of 1,127,064 flying hours (USAF 2003f), or a rate of 0.0052 strikes per flying hour. It is estimated Travis AFB C-17 aircrews would fly a combined 942 hours annually on all the MTRs. Using this estimate of flying time and the Air Force-wide data for 2002, it is anticipated that about five bird-aircraft strikes would occur annually from Travis AFB C-17 MTR operations.

The number of bird-aircraft strikes described in the previous paragraphs could fluctuate as a result of the cyclical patterns of bird populations. Historically, 1/2 of 1 percent of all reported bird-aircraft strikes involving Air Force aircraft resulted in a serious mishap. Therefore, it is unlikely that any of these bird-aircraft strike incidents would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).

4.3.11.5 Mitigation

No significant airspace and airfield operations, MTR operations, aircraft safety, or BASH impacts would be anticipated. Thus, no mitigation would be required.

4.3.11.6 Cumulative Impacts

Coast Guard C-130 aircrews also would accomplish airspace and airfield operations at Travis AFB under the cumulative condition. The number of annual operations associated with Travis AFB within the airspace would increase from a baseline of about 17,250 operations (47 per day) to 19,197 operations (53 per day). The operating characteristics of the Coast Guard C-130s would be identical to the C-130s that operate at Travis AFB as transient aircraft under the baseline condition. The existing air traffic control procedures and airspace infrastructure surrounding Travis AFB has the capability to accommodate the anticipated operations.

Under the cumulative condition, average daily airfield operations at Travis AFB would decrease by 1.52 operations from 242.81 to 241.29 operations (see Tables 2.4.1-1 and 2.5.1-2, respectively). The airfield has the capacity to accommodate this level of operations. The operating characteristics of the Coast Guard C-130s would be identical to the C-130s that operate at Travis AFB under the baseline condition. Thus, the existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, would accommodate the operations under the cumulative condition.

Table-4.3.11-1 lists the number of Class A mishaps, the lifetime class A mishap rate, the number of years for which data are maintained, and the cumulative flight hours for the C-130 aircraft. The table reflects the Air Force-wide data for all elements of all missions and sorties for the aircraft. The operating characteristics of the Coast Guard C-130s in the traffic patterns are identical to Air Force C-130s. Thus, Air Force mishap data are use for this analysis. It is anticipated the mishap distribution discussed in Subchapter 3.1.11.4 for takeoffs and landings, as well as the baseline class A mishap rates in Table 4.3.11-1 for all phases of flight, would apply to the C-130 operations anticipated under the cumulative condition. The Proposed Action discussion and analyses for the C-17, C-5, and KC-10 apply to the cumulative condition. For these reasons, the probability is low that a C-130 involved in an accident at or around the Travis AFB would strike a person or structure on the ground.

Table 4.3.11-1 C-130 Class A Aircraft Mishap Information

Aircraft	Class A Mishaps	Class A Mishap Rate	Years of Data	Cumulative Flight Hours
C-130	148	0.93	48	15,832,323

Note: The mishap rate is an annual average based on the total mishaps and 100,000 flying hours. The greatest number of Class A mishaps in any one year is two.

Sources: USAF 2003g.

The bird-aircraft strike assessment factors for the Proposed Action in Subchapter 4.3.11.4 apply to the cumulative condition. Likewise, the bird-aircraft strike fluctuation and bird-aircraft strikes-serious mishap information for the Proposed Action

apply. Overall, it is estimated the total flying hours for the C-17, C-5, and KC-10 aircraft plus the C-130 within the ROI airspace would increase under the Proposed Action by about 5 percent when compared to the baseline. Thus, bird-aircraft strikes associated with airfield operations at Travis AFB would be expected to increase commensurate with the change in flying hours. Based on the 2002 data in Table 3.1.11-3, it is estimated that 88 bird-aircraft strikes would occur for a 1-year period. However, when considering the 10-year average data, the number of annual strikes could be as high as 354.

4.3.12 Environmental Management

Impacts to pollution prevention would be considered significant if the federal action resulted in generated quantities of pollution prevention elements over and above established baseline levels. Impacts to asbestos and LBP management would be considered significant if the federal action resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts to the installation restoration program would be considered significant if the federal action disturbed (or created) contaminated sites resulting in adverse effects to human health or the environment. An impact is considered significant if it would result in one or more of the following: (1) exposure of people or structures to major geologic or chemical hazards; (2) occurrence of substantial erosion or siltation; (3) uncontrolled release of chemicals/fuels into the environment; (4) occurrence of substantial landsliding; or (5) substantial damage to project structures/facilities.

4.3.12.1 Travis AFB

Pollution Prevention

The Proposed Action would result in construction of new facilities and the introduction of C-17 aircraft at Travis AFB. The activities associated with the action would be accomplished under existing Air Force and Base directives, as well as innovative pollution prevention technologies, to achieve the P2 goals of minimizing or eliminating the use of hazardous materials, reducing the volume of hazardous wastes and the release of pollution into the environment, and conserving energy.

Asbestos and Lead-based Paint

It is possible that asbestos and LBP could be encountered in older buildings that would be demolished. The demolition contractor would be responsible for all ACM and LBP removal. Friable ACM would be removed by a licensed asbestos abatement contractor using glove-bag techniques just prior to actual demolition of the building. If this procedure is used, asbestos-containing areas would not require polyethylene containment and negative pressure. Non-friable ACM could be disposed as solid waste along with other construction debris as long as the landfill is permitted to accept non-friable ACM. Non-friable asbestos will be moistened just prior to removal to minimize airborne fibers. Debris mixed with ACM debris must be kept wet and must be sent to an asbestos-approved landfill. Removal of LBP would comply with 29 CFR 1910. The proposed facilities would be constructed or renovated without any ACM and LBP. Buildings or structures proposed for demolition would be

evaluated by the Bioenvironmental Engineering to determine if an asbestos survey would be required. In addition, the Base Environmental Flight would coordinate any LBP investigation and actions.

Environmental Restoration Program

Ten facilities would be constructed on or adjacent to seven ERP sites that consist of contaminated soils and groundwater at depths of five feet below the ground surface (see Table 3.1.12-1). Design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would avoid interference with any ongoing investigation and remediation work and would not worsen the condition of, or impair the ability to remediate, any site. Before construction activities begin, the contractor would be required to coordinate with the Base Environmental Flight and Bioenvironmental Engineering to prepare a work plan and health and safety plan in case contamination is encountered during excavation activities. The work plan and health and safety plan would address measures for using field instruments capable of detecting contaminants at harmful levels. Soil gas associated with the plume could enter the building at levels that could present a long-term health risk. For this reason, buildings to be constructed over any contaminated groundwater plumes would be designed to include a subterranean vapor barrier, closed barrier seams, and a passive vent system.

Geology

New facilities construction under the Proposed Action would not result in any substantial changes to physiographic features. Sites would be cleared and stabilized to enable construction of foundations and structures. No change in the site elevation would be anticipated. Alteration of ground surface would be minimal. Facility design and construction would incorporate recommendations of a site-specific geotechnical investigation, as appropriate.

It is anticipated the facilities would not be located in areas of known earthquake faults. Because the project site is not located along any known faults, the potential for surface fault rupture occurring at the project sites is considered to be low. Since earthquake-related hazards cannot be avoided in the region, the project site could be subjected to seismic shaking and strong ground motion. Upon completion, the Proposed Action would not result in any increase in exposure of people to potential impacts from seismic ground shaking.

Soils

Construction activity under the Proposed Action would occur within an area in which the soils have been disturbed and modified by prior construction. The contractor would ensure a storm water pollution prevention plan is completed and approved before initiating activities. The plan likely would include erosion control techniques that would be used during demolition and construction to minimize erosion.

Earthwork would be planned and conducted in such a manner to minimize the duration of exposure of unprotected soils. Side slopes and back slopes would be protected

immediately upon completion of rough grading. Protection would be provided by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Slopes too steep for stabilization by other means would be stabilized by hydroseeding, mulch anchored in place, covering by anchored netting, sodding, or such combination of these and other methods as may be necessary for effective erosion control. Use of best management practices such as rock berms, silt fences, and single point construction entries would minimize erosion during demolition and construction. Grass and other landscaping would be reestablished in the disturbed areas immediately after completion of construction, thereby reducing the potential for erosion. For these reasons, no significant soils impacts would be expected.

The Proposed Action would result in removal of topsoil for construction of the proposed facilities and structures. Any topsoil removed from the site would be replaced at other locations upon completion of the project.

4.3.12.2 Mitigation

No significant pollution prevention, ERP, geology, or soils impacts would be anticipated. For this reason, no mitigation measures would be required.

4.3.12.3 Cumulative Impacts

The construction contractor for other projects would be required to comply with the regulatory requirements and best management practices identified for the Proposed Action. Although some of the other actions are adjacent to Proposed Action project sites, use of the regulatory requirements and best management practices identified for the Proposed Action would minimize the potential for cumulative impacts. When completed, activities at the other facilities would be managed in accordance with applicable environmental plans and policies. No cumulative pollution prevention, asbestos and LBP management, ERP, geology, or soils impacts would be anticipated.

4.4 ALTERNATIVE ACTION, MCCHORD AFB

4.4.1 Introduction

Basing 12 additional C-17 aircraft at McChord AFB would enhance the capability of the Air Force to meet the national military strategy by modernizing strategic and tactical airlift aircraft on the west coast. The McChord AFB mission of providing airlift of troops, equipment, and passengers would be expanded with the additional C-17 aircraft.

4.4.2 Air Quality

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action at Travis AFB in Subchapter 4.3.2. Under the Alternative Action, 60 total C-17 aircraft would be based at McChord AFB and 16 construction projects would be accomplished at Base facilities. Aircraft maintenance activities would occur at the Base, airfield operations would be accomplished at McChord AFB, C-17 ALZ, other airfield operations would occur at Grant County Airport, and MTR operations would occur on the nine routes in Washington and Idaho.

4.4.2.1 McChord AFB

The methodologies used to estimate emissions from construction projects, airfield operations, and aircraft maintenance activities at Travis AFB were used to determine the emissions for McChord AFB under the Alternative Action. Table 4.4.2-1 lists the emissions anticipated from the Alternative Action at McChord AFB and compares the emissions to the baseline AQCR emissions inventory. Table 4.4.2-2 shows the net change in emissions from aircraft operations-related activities at McChord AFB when compared to the baseline condition.

Table 4.4.2-1 Alternative Action Emissions, McChord AFB

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)
AQCR 229 CY98 Totals[a]	24,000	5,000	8,000	2,000	1,000
Alternative Action					
Construction Emissions[b]	0.406	0.127	1.865	0.000	0.133
Construction Emissions as Percent of AQCR Emissions	0.0017%	0.0025%	0.0233%	0.0000%	0.0133%
Aircraft Emissions[b]					
AGE Operation[b]	167.025	17.345	6.290	0.070	0.450
Airfield Operations[b]	111.000	14.000	831.000	0.000	167.000
Aircraft Trim/Power Checks[b]	1.765	0.275	24.565	0.555	0.000
Annual Aircraft Emissions[b]	279.790	31.620	861.855	0.625	167.450
Aircraft Emissions as Percent of AQCR Emissions	1.1658%	0.6324%	10.7732%	0.0313%	16.7450%

a PSCAA 2002.
b Estimated emissions from Alternative Action activities.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant.

Table 4.4.2-2 Net Change in Emissions from Aircraft Operations Activities, Alternative Action, McChord AFB

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Baseline Emissions	223.832	25.296	689.484	0.500	133.960
Annual Aircraft Operations Activities Emissions	279.790	31.620	861.855	0.625	167.450
Net Change in Aircraft Operations Activities Emissions	+55.958	+6.324	+172.371	+0.125	+33.490
Net Change as Percent of Baseline	+25.0%	+25.0%	+25.0%	+25.0%	+25.0%

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. Data are reflected as tpy.

Emissions from ground disturbing, construction, demolition, and paving activities would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

The construction emissions presented in Table 4.4.2-1 include the estimated annual emissions from construction equipment exhaust associated with the Alternative Action at McChord AFB. As with fugitive dust emissions, combustion emissions would produce slightly elevated air pollutant concentrations. However, the effects would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-term impacts.

AGE and airfield operations, as well as aircraft trim/power checks, would generate emissions on a recurring basis. Table 4.4.2-1 lists the annual emissions from these operations for the Alternative Action condition of 60 C-17 aircraft at McChord AFB. Review of data in the table indicates that the greatest increase in emissions from Alternative Action activities would be NO_x (861.855 tons) from recurring aircraft operations, which equates to 10.7732 percent of the NO_x emissions within the AQCR. PM_{10} emissions would be 16.7450 percent of the AQCR baseline. Although the NO_x and PM_{10} emissions in the AQCR exceed 10 percent of the baseline for the pollutants, the AQCR is in attainment for both pollutants. Emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. The air emission impacts from the activities associated with the Alternative Action would not be considered regionally significant and a Conformity Determination would not be required.

In summary, emissions from the construction activities would be temporary and would be eliminated when the activities are completed, and would not be regionally significant. Emissions from aircraft and AGE operations, as well as aircraft trim/power checks, would not be considered regionally significant.

4.4.2.2 Grant County Airport

No construction or aircraft maintenance activities would occur at Grant County Airport as a result of the Alternative Action. Therefore, emissions from ALZ and other airfield operations at the airport would generate emissions on a recurring basis. The methodology for determining emissions from airfield operations at Travis AFB was used to calculate the emissions for Grant County Airport. Table 4.4.2-3 lists the annual emissions from these operations and compares the emissions to the baseline AQCR emissions inventory. Table 4.4.2-4 shows the net change in emissions from aircraft operations-related activities at McChord AFB when compared to the baseline condition.

As shown in Table 4.4.2-3, AQCR 62 is nonattainment for PM_{10}. Based on the emissions calculations that are summarized in the table, the net change in emissions for the criteria pollutants would be less than 10 percent of the emissions inventory and the action would not be considered regionally significant. Additionally, the net change in emissions would not exceed the *de minimis* thresholds.

Table 4.4.2-3 Alternative Action Emissions, Grant County Airport

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)
AQCR CY99Totals[a]	29,350	989	1,830	7,200	**3,860**
Alternative Action					
Aircraft Emissions[b]	131	22	1,884	0	320
Aircraft Emissions as Percent of AQCR Emissions	0.4463%	2.2245%	102.9508%	0.0000%	8.2902%

a AIRdata 2003.
b Estimated emissions from Alternative Action activities.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment.

Table 4.4.2-4 Net Change in Emissions from Aircraft Operations Activities, Alternative Action, Grant County Airport

Activity	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
Baseline Emissions	105	18	1,507	0	256
Annual Aircraft Operations Activities Emissions	131	22	1,884	0	320
Net Change in Aircraft Operations Activities Emissions	+26	+4	+377	+0	+64
Net Change as Percent of Baseline	+25.0%	+25.0%	+25.0%	+25.0%	+25.0%

Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. Data are reflected as tpy.

Table 4.4.2-3 lists the annual emissions from these operations for the Alternative Action at Grant County Airport. Review of data in the table indicates that the greatest increase in emissions from Alternative Action activities would be NO_x (1,884 tons) from recurring aircraft operations, which equates to 102.9508 percent of the NO_x emissions within the AQCR. Although the NO_x emissions exceed 10 percent, the AQCR is in attainment for the pollutant. Thus; the emissions would not be regionally significant. The emissions for the other criteria pollutants would not exceed 10 percent of the emissions inventory. The air emission impacts from the activities associated with the Alternative Action would not be considered significant and a Conformity Determination would not be required.

4.4.2.3 Military Training Routes

McChord AFB C-17 aircrews would accomplish operations on MTRs in Washington and Idaho. Table 4.4.2-5 lists the estimated emissions for C-17 operations on the Proposed Action MTRs within the respective AQCR and compares the emissions to the baseline condition. The same MTR may be included in more than one AQCR due to the routes length and location.

Table 4.4.2-5 Proposed Action Emissions, Military Training Routes

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM_{10} (tpy)
AQCR 62					
CY99Totals[a]	**29,350**	898	1,830	7,200	**3,860**
IR-324/325	2.37	1.38	197.92	0.00	15.23
IR-326	1.15	0.67	96.07	0.00	7.39
IR-327/328	1.29	0.75	107.64	0.00	8.28
IR-329	0.28	0.16	23.15	0.00	1.78
IR-330	0.56	0.32	46.30	0.00	3.56
IR-340	3.05	1.78	254.63	0.00	19.59
Total MTR Operations	8.70	5.06	725.71	0.00	55.83
MTR Emissions as Percent of AQCR Emissions	0.0296%	0.5116%	39.6563%	0.0000%	1.4464%
AQCR 63					
CY99Totals[a]	856	147	1,426	1,087	2,364
IR-340	2.35	1.37	195.60	0.00	15.05
Total MTR Operations	2.35	1.37	195.60	0.00	15.05
MTR Emissions as Percent of AQCR Emissions	0.2745%	0.9320%	13.7167%	0.0000%	0.6366%
AQCR 193					
CY99Totals[a]	48,630	3,770	29,140	92,180	4,640
VR-331	0.37	0.22	31.25	0.00	2.40
Total MTR Operations	0.37	0.22	31.25	0.00	2.40
MTR Emissions as Percent of AQCR Emissions	0.0008%	0.0058%	0.1072%	0.0000%	0.0517%
AQCR 227					
CY99Totals[a]	4,340	380	660	4,420	220
IR-324/325	0.79	0.46	65.97	0.00	5.08
IR-327/328	1.83	1.07	152.78	0.00	11.76
IR-330	0.15	0.09	12.73	0.00	0.98
Total MTR Operations	2.77	1.62	231.48	0.00	17.82
MTR Emissions as Percent of AQCR Emissions	0.0638%	0.4263%	35.0727%	0.0000%	8.1000%
AQCR 228					
CY99Totals[a]	38,072	3,906	10,451	18,870	2,448
VR-331	1.15	0.67	95.49	0.00	7.35
Total MTR Operations	1.15	0.67	95.49	0.00	7.35
MTR Emissions as Percent of AQCR Emissions	0.0030%	0.0172%	0.9137%	0.0000%	0.3002%
AQCR 229					
CY99Totals[a]	25,290	7,030	14,070	4,970	2,600
VR-331	0.17	0.10	13.89	0.00	1.07
Total MTR Operations	0.17	0.10	13.89	0.00	1.07
MTR Emissions as Percent of AQCR Emissions	0.0007%	0.0014%	0.0987%	0.0000%	0.0412%
AQCR 230					
CY99Totals[a]	**20,400**	1,930	3,880	3,800	**1,530**
IR-326	0.28	0.16	23.15	0.00	1.78
IR-329	0.71	0.41	59.03	0.00	4.54
IR-340	0.72	0.42	60.19	0.00	4.63
Total MTR Operations	1.71	0.99	142.37	0.00	10.95
MTR Emissions as Percent of AQCR Emissions	0.0084%	0.0513%	3.6693%	0.0000%	0.7157%

a AirData 2003.
b Estimated emissions from Proposed Action activities.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. **Bold** indicates pollutants not in attainment. Data are reflected as tpy.

As shown in Table 4.4.2-5, AQCRs 62 and 230 are nonattainment for CO and PM_{10}. Based on the emissions calculations that are summarized in the table, the net change in emissions for the criteria pollutants would be less than 10 percent of the emissions inventory and the action would not be considered regionally significant. Additionally, the net change in emissions would not exceed the *de minimis* thresholds.

Review of data in Table 4.4.2-5 for the AQCRs indicates that the greatest increase in emissions from MTR operations would be NO_x (725.71 tpy) from recurring aircraft operations in AQCR 62, which equates to 39.6563 percent of the NO_x emissions within the AQCR. NO_x emissions in AQCRs 63 and 227 would respectively be 13.7167 and 35.0727 percent of the baseline inventory. Although the NO_x emissions in the three AQCRs exceed 10 percent of the baseline for the pollutant, each AQCR is in attainment for NO_x. Therefore, the emissions from the action would not be considered regionally significant.

All emissions in AQCRs 193, 228, 229, and 230, as well as the other pollutant emissions in AQCRs 62, 63, and 227, fall below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852. However, the AQCRs are in attainment. Therefore, the air emission impacts from the activities associated with the Alternative Action in these AQCRs would not be considered significant and a Conformity Determination would not be required.

4.4.2.4 Mitigation

No significant air quality impacts would be anticipated. No mitigation would be necessary.

4.4.2.5 Cumulative Impacts

Numerous construction projects would be accomplished under the other actions announced for McChord AFB. The methodologies for calculating emissions for the Proposed Action at Travis AFB were used for the cumulative condition at McChord AFB. Table 4.4.2-6 summarizes the construction emissions from the other actions as well as the Alternative Action and compares the emissions with the baseline. There would be no additional airfield operations under the other actions. Therefore, only construction emissions are analyzed.

Table 4.4.2-6 Cumulative Condition Emissions, McChord AFB

Criteria Air Pollutant	CO (tpy)	VOC (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)
AQCR 229 CY98 Totals[a]	24,000	5,000	8,000	2,000	1,000
Construction Emissions					
Other Action Emissions	0.3000	0.1000	1.3000	0.0000	0.1000
Proposed Action Emissions[b]	0.4056	0.1269	1.8653	0.0000	0.1325
Total Construction Emissions	0.7056	0.2269	3.1653	0.0000	0.2350
Construction Emissions as Percent of AQCR Emissions	0.0029%	0.0045%	0.0396%	0.0000%	0.0233%

a AIRData 2002..
b Estimated emissions from Proposed Action activities.
Note: VOCs are not an air pollutant criterion. However, VOCs are reported because, as an O_3 precursor, it is a controlled pollutant. $PM_{2.5}$ included for information only.

Emissions from ground disturbing, construction, demolition, and paving activities would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts. Table 4.4.2-6 lists the annual emissions from these operations for the Alternative Action cumulative condition at McChord AFB. Review of data in the table indicates that the greatest increase in emissions from Alternative Action cumulative condition activities would be NO_x (3.1653 tons) from recurring aircraft operations, which equates to 0.396 percent of the NO_x emissions within the AQCR. Emissions from the cumulative construction condition would not be regionally significant.

4.4.3 Noise

Significance criteria for the Alternative Action at McChord AFB and the Grant County Airport would be the same as that stated for the Proposed Action in Subchapter 4.3.3.

4.4.3.1 McChord AFB

Figure 4.4.3-1 depicts the noise exposure area form aircraft operations after the additional 12 C-17s would be based at McChord AFB, increasing the total number of C-17s to 60 aircraft. Figure 4.4.3-2 compares the Alternative Action contours with the baseline. There would be no change to the baseline condition aircraft ground tracks under the Alternative Action at McChord AFB (see Figure 3.2.3-1).

Table 4.4.3-1 compares the DNL changes from the baseline for the Alternative Action at the specific analysis points. There would be no change to the aircraft types or aircraft flight tracks and profiles from the baseline condition. Therefore, the SEL would not change from the baseline condition. Table 4.4.3-2 compares the off-Base land area and population exposed to noise of DNL 65 dBA and greater, as well as the potentially highly annoyed, for the Alternative Action with the baseline condition. No on-Base residential areas would be exposed to DNL 65 dBA or greater. Therefore, no analysis is accomplished for on-Base. There would be an overall 14 percent increase in the number of people exposed to DNL

65 dBA and greater. Data from these tables are used for analysis in the day-night sound analysis section.

Table 4.4.3-1 Comparison of DNL from Proposed Airfield Operations at Specific Analysis Points with Baseline, Alternative Action, McChord AFB

		DNL (dBA)		
Number	**Description**	**BL**	**PA**	**Chg**
1	Tyee Park Elem. School	57	58	+1
2	Southgate Elem. School	60	61	+1
3	Residential Area No. 1	61	62	+1
4	Residential Area No. 2	71	72	+1
5	Oakwood Elem. School	66	67	+1
6	Arlington Elem. School	64	65	+1
7A	Gray Middle School	62	62	0
7B	Edison Elem. School	61	62	+1
8	Mason Middle School	55	56	+1
9	Allenmore Hospital	54	55	+1
10	Baker Middle School	56	57	+1
11	Sales Elem. School	54	55	+1
12A	Keithley Middle School	52	53	+1
12B	Washington High School	54	55	+1
13	Brookdale Elem. School	51	52	+1
14	Christensen Elem. School	52	53	+1
15	Elmhurst Elem. School	48	48	0
16	Pacific Lutheran Univ.	51	51	0
17	Birney Elem. School	59	60	+1
18	Fern Hill Elem. School	56	57	+1
19	Larchmont Elem. School	53	54	+1
20	St. Clair Hospital	46	46	0
21	Carter Lake Elem. School	50	51	+1
22	Heartwood Elem. School	44	45	+1
23	Lakeview Elem. School	57	58	+1
24	Our Lady Church	54	55	+1
25	Camas Prairie Elem. School	50	48	-2
26	Spanaway Elem. School	53	54	+1
27	Spanaway Jr. High School	52	53	+1
28	Thompson Elem. School	52	53	+1

Note: BL=baseline. PA=Proposed Action. Chg=change. There would be no change to the aircraft types or flight tracks and profiles these aircraft would fly. Thus, SEL is not listed. See Table 3.2.3-1 for SEL. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the DNL for a point from the table to the DNL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

Table 4.4.3-2 Summary of Off-Base Land Area and Population Exposed to, and Population Potentially Highly Annoyed by DNL 65 dBA and Greater, Alternative Action, McChord AFB

	DNL Interval (dBA)				
Category	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres					
Baseline Acres	684	148	5	0	837
Alternative Action	821	195	14	0	1,030
Change	+137	+47	+9	0	+193
Percent Change	+20%	+32%	+180%	0%	+23%
Population					
Baseline Population	3,434	259	0	0	3,693
Alternative Action	3,496	707	0	0	4,203
Change	+62	+448	0	0	+510
Percent Change	+2%	+173%	0%	0%	+14%
Population Highly Annoyed					
Baseline Population	755	96	0	0	851
Alternative Action	769	262	0	0	1,033
Change	+14	+166	0	0	+180
Percent Change	+2%	+173%	0%	0%	+21%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

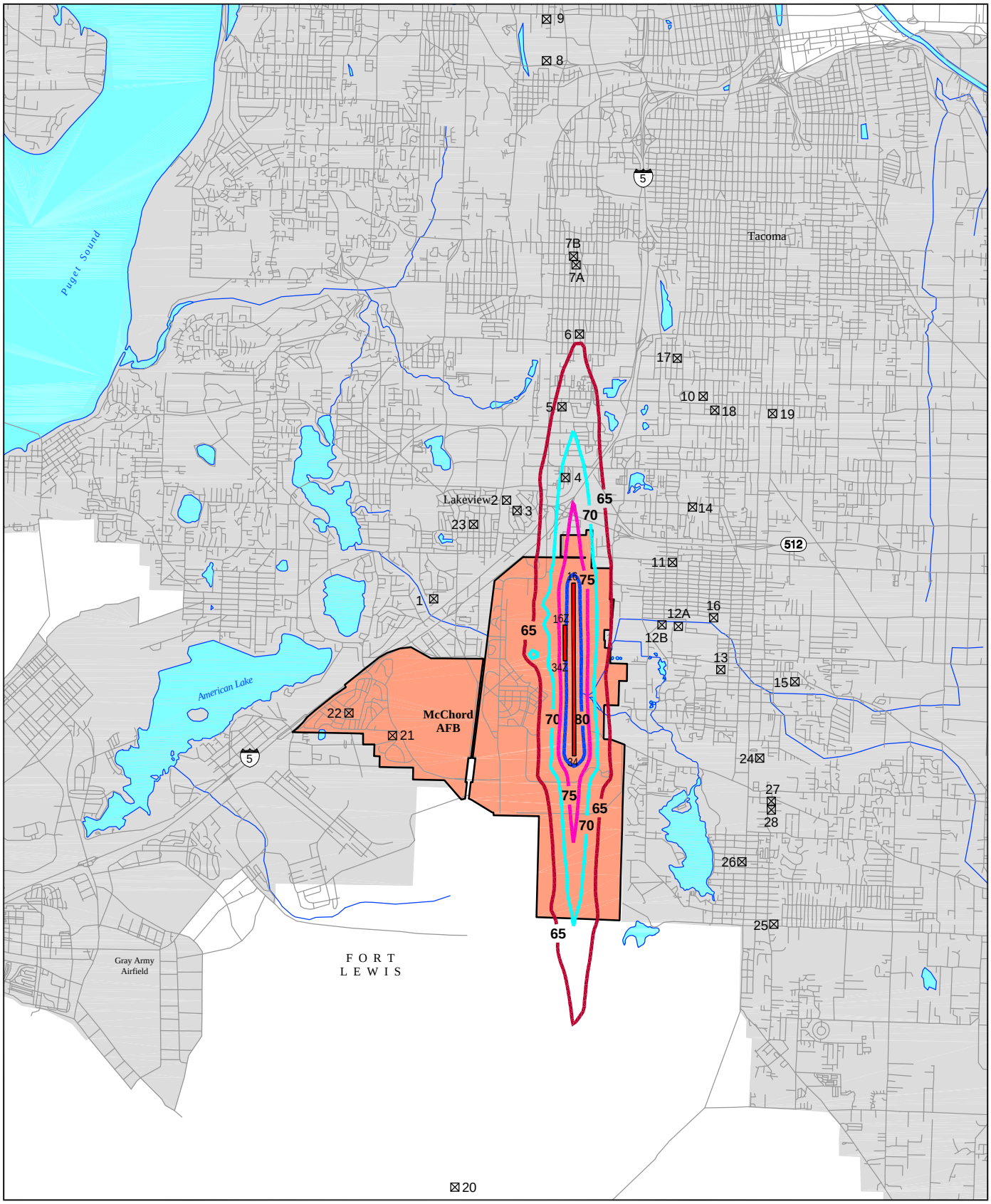
Single Event Sound Analysis, McChord AFB

Sound Exposure Level

A total of 30 representative specific points were selected under the traffic patterns and around the airfield to calculate the SEL due to aircraft overflight. The noise contour and aircraft ground track figures show the locations of the specific analysis points.

C-17 aircraft operate at McChord AFB under the baseline condition. Although there would be additional C-17 operations at the Base under the Alternative Action, there would be no change in the aircraft ground tracks or flight profiles for the aircraft. Likewise, there would be no change in the other types of aircraft that operate at the Base. There would be no change in the SEL listed in Table 3.2.3-2 since SEL is related to the single event on a flight track.

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McChord Air Force Base

LEGEND

- DNL 65 dBA Contour
- DNL 70 dBA Contour
- DNL 75 dBA Contour
- DNL 80 dBA Contour
- Runway
- Roadway
- ⊠ Analysis Point
- McChord AFB

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Feet

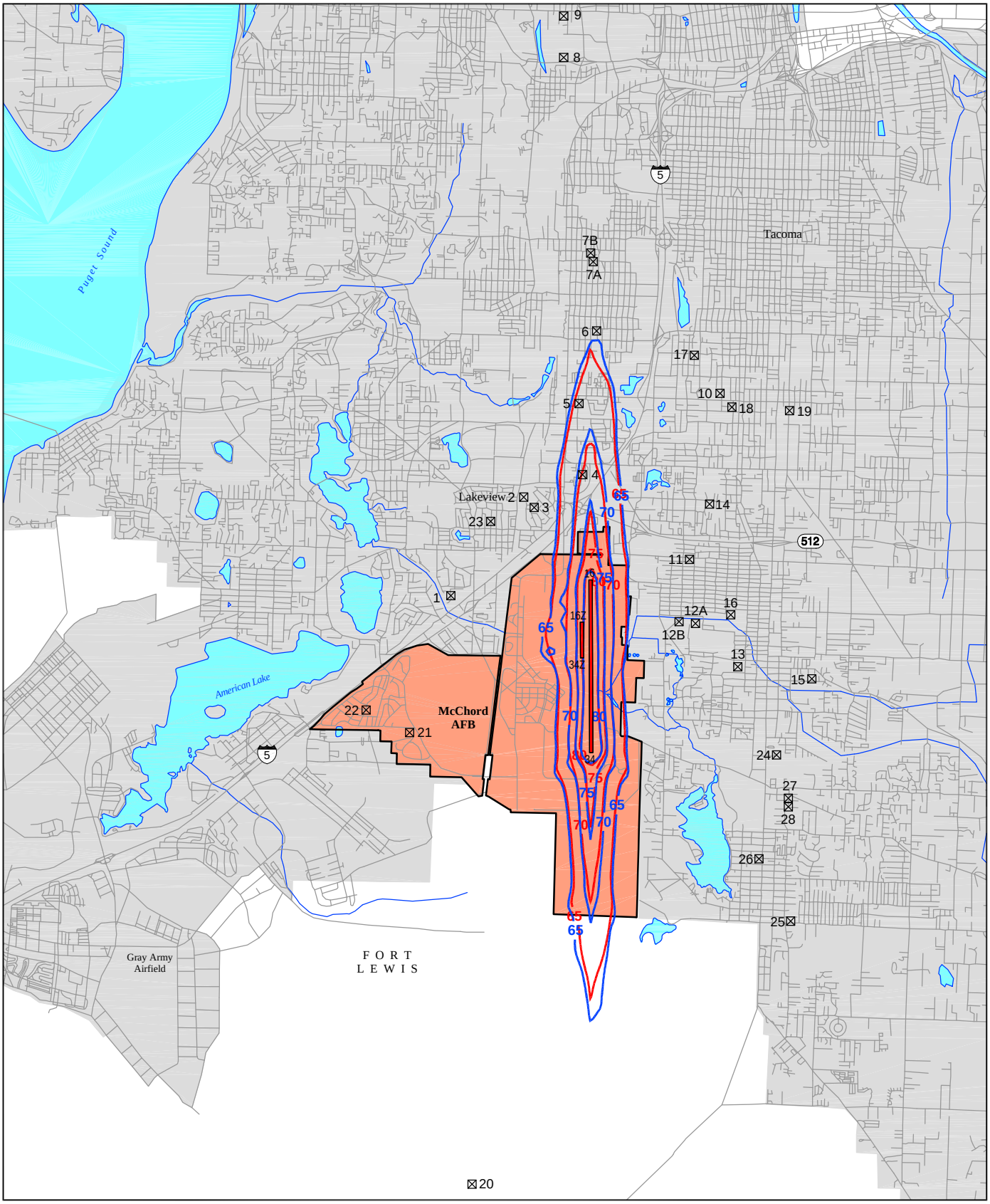
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Alternative Action Noise Contours McChord AFB

Figure 4.4.3-1

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McChord Air Force Base

LEGEND

- Baseline Noise Contours
- Alternative Action Noise Contours
- Runway
- Roadway
- Analysis Point
- McChord AFB

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Comparison of Baseline and Alternative Action Noise Contours McChord AFB

Figure 4.4.3-2

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Sleep Disturbance

The introductory sleep disturbance and background information for Travis AFB in Subchapter 4.3.3.1 applies to McChord AFB. Individuals in residences in the area around the Base would continue to be exposed to indoor SEL of 60qto 80 dBA during normal sleep periods (10:00 p.m. to 7:00 a.m.). There would be 510 additional persons exposed to DNL 65 dBA and greater as a result of the Alternative Action. Assuming the number of sleep awakenings would be proportional to the decrease in exposed population, it is anticipated there would be the potential for an additional 51 persons who could be awakened when comparing the Alternative Action to the baseline condition.

Effects of Noise on Structures

The maximum sound pressure produced by C-17 aircraft at McChord AFB would be 112 dBA at 100 feet from the aircraft. At a distance of 1,000 feet, the C-17 aircraft generates a maximum sound pressure of 91 dBA. The maximum sound pressure is the highest instantaneous sound pressure during a single noise event no matter how long the sound may persist. Maximum sound pressure is different than SEL, which is the A-weighted sound level integrated over the duration of the noise event and adjusted to a length of 1 second. Therefore, no damage to structures in the area surrounding McChord AFB would be anticipated because the sound pressure produced by the aircraft would not exceed the level at which structural damage could occur.

Construction Noise

The primary source of noise from the facilities would be the equipment involved in construction activities. Construction noise would be intermittent and short-term in duration. Typical noise levels from heavy equipment range from 75 to 89 dBA at 50 feet from the source. See Table 4.3.3-4 for a list of construction equipment and associated noise levels. The construction noise assumptions and analysis for the Proposed Action at Travis AFB applies to the Alternative Action at McChord AFB.

Day-Night Sound Analysis, McChord AFB

Overall, the Alternative Action noise contours would retain the same basic shape as the baseline contours (see Figure 4.4.3-2), with the number of acres in the DNL 65 dBA and greater exposure area increasing by 23 percent. However, the DNL 65, 70, and 75 dBA contours each extend about 500 feet farther north and approximately 1,100 feet farther south. Each contour extends laterally about 200 feet along the north-south axis of the contour pattern.

As indicated in Table 4.4.3-1, the DNL would decrease by as much as 1 dBA at 25 of the analysis points, remain the same at one point, and decrease by 2 dBA at one point. Assuming the analysis points are representative of points within the area around the airfield and based on the fact that the DNL would increase by 1 dBA, it is anticipated that the DNL would not increase at any point within the area around the airfield or below the aircraft flight tracks by more than 1 dBA.

As indicated in Table 4.4.3-2, the number of persons in the DNL 65-70 and 70-75 dBA noise zones would increase by about 2 percent and 173 percent, respectively. There would continue to be no persons in the DNL 75 dBA and greater noise exposure area. Although the overall area of noise exposure increases by 23 percent, the number of persons exposed to greater noise increases by 14 percent (510 people). The 510-person increase would occur at the north end of the noise exposure area, in an area of residential land use. When dividing the 510 persons by the additionally exposed area (*i.e.*, 184 acres), the density would be 2.77 persons per acre, a density typical for adjacent residential areas exposed to aircraft noise under the baseline. The overall number of persons who would be highly annoyed by noise exposure would increase by 180 people (21 percent).

Assuming the number of conversations is proportional to the increase in exposed population and the increase in airfield operations, it is anticipated there would be a corresponding increase in the potential for speech disruption. The discussions and analyses for the Proposed Action at Travis AFB for hearing loss and nonauditory health effects, apply to the Alternative Action at McChord AFB.

Under the Alternative Action, the outdoor DNL at the schools identified for analysis would increase by 1 dBA at 21 schools, remain the same at 3, and decrease by 2 dBA at one school. The greatest DNL at any school would be 67 dBA, while the C-17 outdoor SEL would be 105 dBA. Indoor noise levels are generally 20 dB lower than outdoor noise levels because building structures attenuate the outdoor noise levels. The classroom interruption for the Proposed Action at Travis AFB applies to the Alternative Action at McChord AFB.

There could be an increase in speech disruption from aircraft overflight and there should be no noise-induced hearing loss impacts. Classroom disruption could increase due to the increase in aircraft-produced noise at the schools and the overflights from the additional airfield operations. The overall effect of the Alternative Action at McChord AFB would be an approximate 14 percent increase in the number of people exposed to DNL 65 dBA and greater.

4.4.3.2 Grant County Airport

Figure 4.4.3-3 depicts the noise exposure area from aircraft operations after the additional 12 C-17s would be based at McChord AFB, increasing the total number of C-17s to 60 aircraft. Figure 4.4.3-4 compares the Alternative Action contours with the baseline. There would be no change to the baseline condition aircraft ground tracks for the Alternative Action at Grant County Airport (see Figure 3.2.3-3).

Table 4.4.3-3 compares the DNL changes from the baseline for the Alternative Action at Grant County Airport at the specific analysis points. There would be no change to the aircraft types or aircraft flight tracks and profiles from the baseline condition. Therefore, the SEL would not change from the baseline condition. Table 4.4.3-4 compares the land area and population exposed to noise of DNL 65-dBA and greater, as well as potentially highly annoyed, for the Alternative Action with the baseline condition. There would be an overall three additional persons exposed to DNL 65 dBA and greater. Data in these tables are used for noise analysis in the day-night sound analysis section.

Table 4.4.3-3 Comparison of DNL from Proposed Airfield Operations at Specific Analysis Points with Baseline, Alternative Action, Grant County Airport

		DNL (dBA)		
Number	**Description**	**BL**	**PA**	**Chg**
1	Big Bend Community College	53	53	0
2	Wallenstein Performing Arts Center	53	54	+1
3	Moses Lake High School	48	49	+1
4	Chief Moses Junior High School	43	43	0
5	Frontier Junior High School	53	53	0
6	Garden Heights Elementary School	47	47	0
7	Knolls Vista Elementary School	55	55	0
8	Lakeview Terrace Elementary School	44	44	0
9	North Elementary School	51	51	0
10	Peninsula Elementary School	39	39	0
11	Longview Elementary School	55	56	+1
12	Larson Heights Elementary School	50	50	0
13	Midway Elementary School	46	46	0
14	Samaritan Hospital	48	48	0

Note: BL=baseline. PA=Proposed Action. Chg=change. There would be no change to the aircraft types or flight tracks and profiles these aircraft would fly. Thus, SEL is not listed. See Table 3.2.3-3 for SEL. The specific analysis point number and description correspond to the point as reflected on the noise contour and aircraft ground track figures. There may be minor differences when comparing the DNL for a point from the table to the DNL for the point as depicted on the noise contour figure. This difference is a result of small misalignments during the process of printing the noise contours on top of the background map.

Table 4.4.3-4 Summary of Land Area and Population Exposed to, and Population Potentially Highly Annoyed by DNL 65 dBA and Greater, Alternative Action, Grant County Airport

	DNL Interval (dBA)				
Category	**65-70**	**70-75**	**75-80**	**80+**	**Total**
Acres					
Baseline Acres	1,202	503	284	62	2,051
Alternative Action	1,250	542	250	134	2,176
Change	+48	+39	+34	+72	+125
Percent Change	+4%	+8%	-12%	+116%	+6%
Population					
Baseline Population	15	5	2	0	22
Alternative Action	18	5	2	0	25
Change	+3	0	0	0	+3
Percent Change	+20%	0%	0%	0%	+14%
Population Highly Annoyed					
Baseline Population	3	2	1	0	6
Alternative Action	4	2	1	0	7
Change	+1	0	0	0	+1
Percent Change	+33%	0%	0%	0%	+17%

Note: People highly annoyed determined by multiplying the total number of people in the noise zone times the higher percent number for the interval in Table 3.1.3-4.

Single Event Sound Analysis, Grant County Airport

Sound Exposure Level

A total of 14 representative specific points were selected under the traffic patterns and around the airfield to calculate the SEL due to aircraft overflight. The noise contour and aircraft ground track figures show the locations of the specific analysis points.

C-17 aircraft operate at Grant County Airport under the baseline condition. Although there would be additional C-7 operations at the airport under the Alternative Action, there would be no change in the aircraft ground tracks or flight profiles for the aircraft. Likewise, there would be no change in the other types of aircraft that operate at the airport. Thus, there would be no change in the SEL listed in Table 3.2.3-3 since SEL is related to the single event on a flight track.

Sleep Disturbance

The introductory sleep disturbance and background information for Travis AFB in Subchapter 4.3.3.1 applies to Grant County Airport. Individuals in residences in the area around the Base would continue to be exposed to indoor SEL of 60 to 80 dBA during normal sleep periods (10:00 p.m. to 7:00 a.m.). There would be 3 additional persons exposed to DNL 65 dBA and greater as a result of the Alternative Action. Assuming the number of sleep awakenings would be proportional to the decrease in exposed population, it is anticipated there would be a potential for a slight corresponding increase in the potential for awakenings when comparing the Alternative Action to the baseline condition.

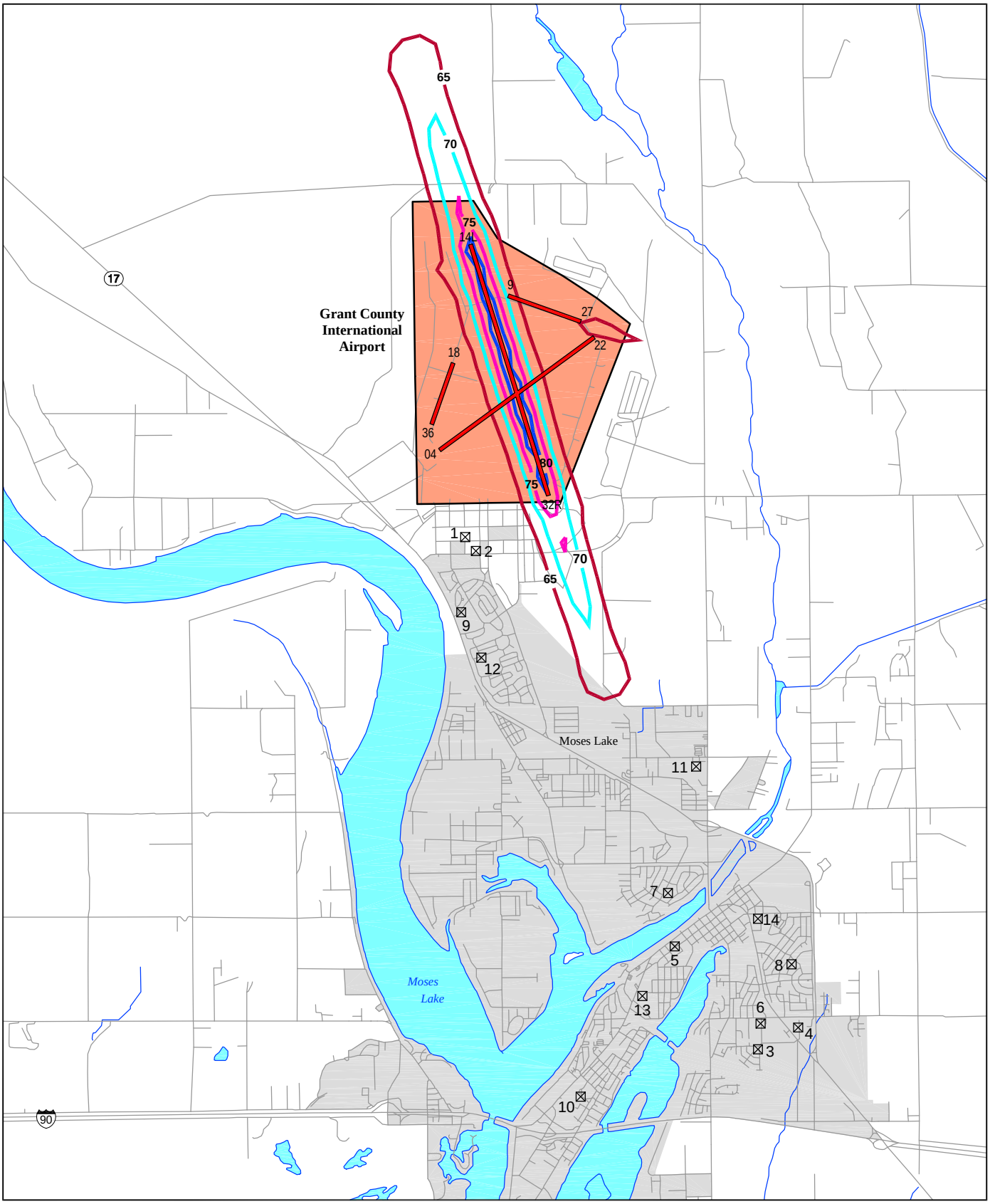
Effects of Noise on Structures

The maximum sound pressure produced by C-17 aircraft at Grant County Airport would be 112 dBA at 100 feet from the aircraft. At a distance of 1,000 feet, the C-17 aircraft generates a maximum sound pressure of 91 dBA. The maximum sound pressure is the highest instantaneous sound pressure during a single noise event no matter how long the sound may persist. Maximum sound pressure is different than SEL, which is the A-weighted sound level integrated over the duration of the noise event and adjusted to a length of 1 second. Therefore, no damage to structures in the area surrounding Grant County Airport would be anticipated because the sound pressure produced by the aircraft would not exceed the level at which structural damage could occur.

Day-Night Sound Analysis, Grant County Airport

Overall, the Alternative Action noise contours would retain the same basic shape as the baseline contours (see Figure 4.4.3-4), with the number of acres in the DNL 65 dBA and greater exposure area increasing by 6 percent. The additional exposure in the DNL 65-70 dBA noise zone occurs primarily at the east end of Runway 11-29 and is associated with the increase in assault landings on the runway. The DNL 70-75 dBA zone extends about 2,000 feet farther to the north and south of Runway 04L/32R. The increased exposure in the DNL 75 dBA and greater area occurs on airport property.

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Grant County International Airport

LEGEND

- DNL 65 dBA Contour
- DNL 70 dBA Contour
- DNL 75 dBA Contour
- DNL 80 dBA Contour
- Runway
- Roadway
- Analysis Point
- Grant County International Airport

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Feet

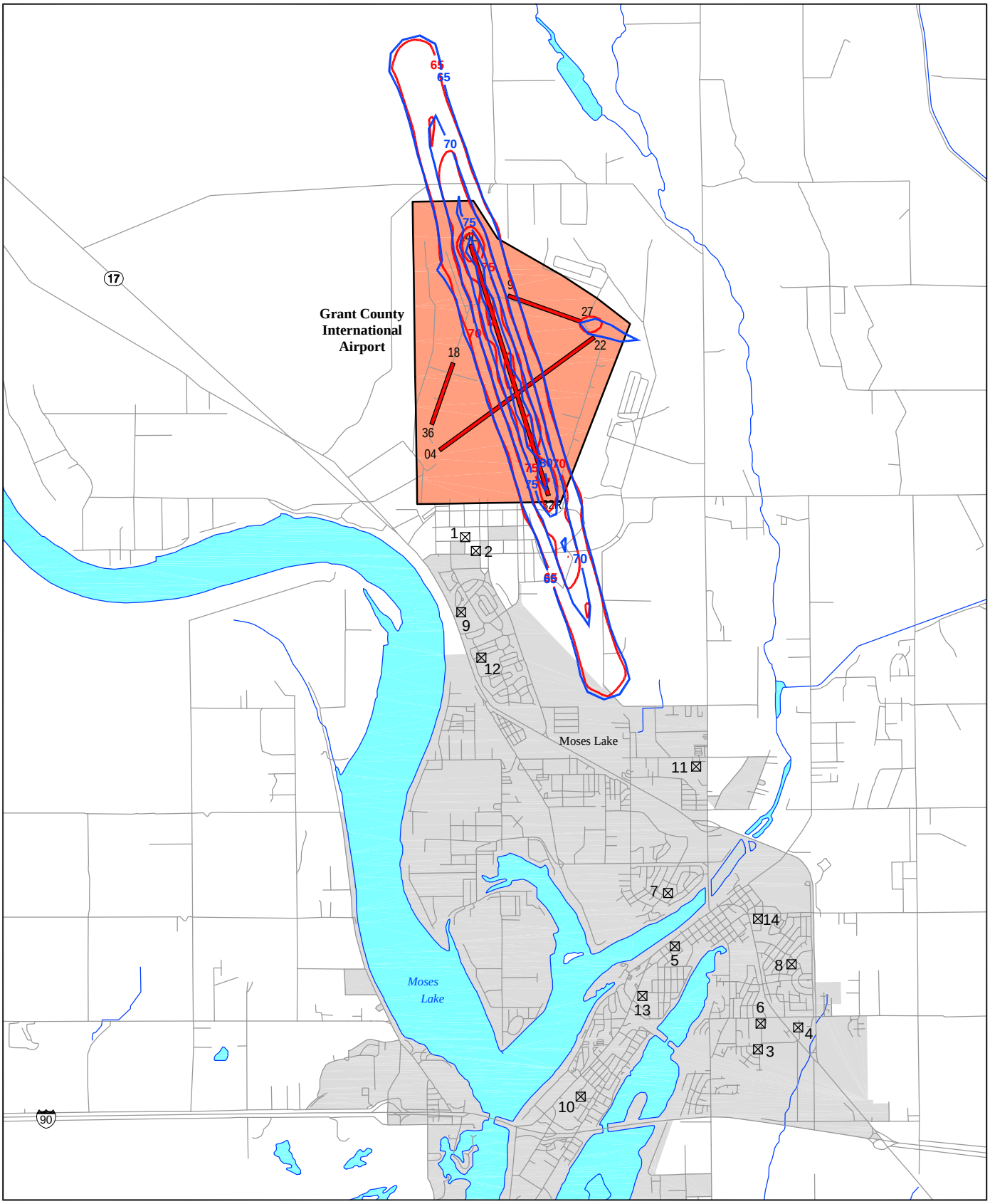
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Alternative Action Noise Contours Grant County Airport

Figure 4.4.3-3

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Grant County International Airport

LEGEND

- Baseline Noise Contour
- Alternative Action Noise Contour
- Runway
- Roadway
- Analysis Point
- Grant County International Airport

7,000 0 7,000

Feet

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Comparison of Baseline and Alternative Action Noise Contours Grant County Airport

Figure 4.4.3-4

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As indicated in Table 4.4.3-3, the DNL would decrease by as much as 1 dBA at three of the analysis points and remain the same at the other 11 points. Assuming the analysis points are representative of points within the area around the airfield and based on the fact that the DNL would increase by 1 dBA, it is anticipated that the DNL would not increase at any point within the area around the airfield or below the aircraft flight tracks by more than 1 dBA.

As indicated in Table 4.4.3-4, the number of persons in the DNL 65 dBA and greater noise exposure area would increase by about three people (14 percent). However, no additional persons would be exposed to DNL 70 dBA and greater. The number of highly annoyed persons would increase by about 17 percent; however, only one additional person would be highly annoyed.

Assuming the number of conversations is proportional to the increase in exposed population and the increase in airfield operations, it is anticipated there would be a corresponding increase in the potential for speech disruption. The discussions and analyses for the Proposed Action at Travis AFB for hearing loss and nonauditory health effects, apply to the Alternative Action at Grant County Airport.

Under the Alternative Action, the outdoor DNL at the schools identified for analysis would increase by 1 dBA at two schools and remain the same at 12 schools. The greatest DNL at any school would be 56 dBA, while the C-17 outdoor SEL would be 89 dBA. Indoor noise levels are generally 20 dB lower than outdoor noise levels because building structures attenuate outdoor noise levels. The classroom interruption for the Proposed Action at Travis AFB applies to the Alternative Action at Grant County Airport.

There could be an increase in speech disruption from aircraft overflight and there should be no noise-induced hearing loss impacts. Classroom disruption could increase due to the overflights from the additional airfield operations. The overall effect of the Alternative Action at the airport would be 3 additional persons exposed to DNL 65 dBA and greater.

4.4.3.3 Military Training Routes

Table 4.4.3-5 compares the L_{dnmr} for the C-17 and other aircraft operations that would occur on the specific routes with the baseline condition. As indicated in the table, the L_{dnmr} ranges from a low of 50 dBA to a high of 60 dBA. As indicated in Table 4.4.3-5, the L_{dnmr} would exceed 55 dBA on one route. There is no reason to expect that the general population would be at risk from any of the effects of noise for sound levels at and below L_{dnmr} 55 dBA (USEPAq1974). Additionally, the L_{dnmr} 60 dBA anticipated for VR-331 would not exceed the HUD, FAA, and Air Force noise level (*i.e.*, L_{dnmr} 65 dBA) at which residential and other noise-sensitive land uses would be unacceptable. The L_{dnmr} would be a maximum of 5 dBA greater than the values stated in Table 4.4.3-5 at the points at which the MTRs intersect or when there are common route segments. Thus, the maximum L_{dnmr} for any route is about 65 dBA.

Table 4.4.3-5 Comparison of Aircraft Noise Levels as a Function of Distance from Aircraft Ground Track Centerline, Alternative Action

	L_{dnmr} (dBA)		
Route	Baseline	PA	Chg.
IR-324/325	54	55	+1
IR-326	49	50	+1
IR-327/328	54	55	+1
IR-329	49	50	+1
IR-330	49	50	+1
IR-340	53	54	+1
VR-331	59	60	+1

Note: L_{dnmr} is represented for 300 feet AGL. IR-325 is the reverse of IR-324. IR-328 is the reverse of IR-327. Thus, operations for Irs-324 and 325 and Irs-327 and 328 are respectively combined for noise modeling purposes.

Noise anticipated from MTR operations would not exceed the level used for hearing loss and speech interference analysis (*i.e.*, L_{dnmr} 75 dBA), and the discussion for these two items in the airfield operations sections apply to MTR operations. Likewise, the sleep disruption and non-auditory health effects discussions from the airfield operations section apply.

Both the L_{dnmr} and SEL decrease as the distance between the receptor and the route centerline increases. There would be no change in the types of aircraft that would use the MTRs when comparing the Alternative Action to the baseline. Thus, the baseline SEL (see Table 3.2.3-6) applies to the Alternative Action.

The L_{max} would be approximately 100 dBA at 300 feet AGL. An L_{max} 100 dBA is well below the threshold at which structural damage would occur (*i.e.*, 127 dBA). Thus, no structural damage would be expected from C-17 operations on an MTR.

The information and analysis concerning wildlife presented for the Proposed Action apply to the Alternative Action.

4.4.3.4 Mitigation

No significant noise impacts would occur from the Alternative Action. Therefore, no mitigation would be required.

4.4.3.5 Cumulative Impacts

Under the cumulative condition, other facilities would be constructed at McChord AFB. As depicted in Figures 2.4.3-1 and 2.5.2-1, the distance between one of the other action construction sites and an Alternative Action site could be as close as 100 feet. For analysis purposes, it is assumed the noisiest piece of construction equipment (89 dB scraper which produces 85 dB at 100 feet from the noise source) is being operated simultaneously at each

site and the distance to a receptor is 100 feet from each construction site. If the intensity of a sound is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, the combined noise from equipment operation at the receptor would be 88 dB. As with the Alternative Action, construction noise would be temporary and occur only during the hours that construction, demolition, or renovation activity would occur and would cease when the project is completed.

4.4.4 Hazardous Wastes, Hazardous Materials, and Stored Fuels

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action in Subchapter 4.3.4.

4.4.4.1 McChord AFB

Hazardous Wastes

The discussion and analysis for construction activities under the Proposed Action at Travis AFB apply to the Alternative Action at McChord AFB.

It is not anticipated that any new hazardous waste streams would occur with implementation of the Alternative Action because the Base currently operates C-17 aircraft. However, it is likely the volume of hazardous wastes would increase by 25 percent due to the additional 12 C-17 aircraft. McChord AFB would continue to be a large-quantity hazardous waste generator. The existing hazardous waste management processes and procedures should accommodate the wastes generated under the Alternative Action. However, it may be necessary to increase waste storage capacity. If needed, McChord AFB would revise its existing HWMP to incorporate activities of the Alternative Action.

Hazardous Materials

The discussion and analysis for construction activities under the Proposed Action at Travis AFB apply to the Alternative Action at McChord AFB.

It is not anticipated that any new hazardous materials would be needed with implementation of the Alternative Action because the Base currently operates C-17 aircraft. However, it is likely the hazardous materials procurement could increase by 25 percent due to the additional 12 aircraft. The existing hazardous materials handling processes and procedures could accommodate the activities associated with C-17 operation and maintenance.

Stored Fuels

The petroleum products that would be used under the Alternative Action are similar in nature to those used by the current aircraft activities at McChord AFB. Fueling and lubrication of equipment would be conducted in a manner that affords maximum protection against spills. Although the amount of fuel consumed could increase by 25 percent due to operating 12 more C-17 aircraft, it is anticipated the existing fuels handling system has the

capacity to store and dispense the additionally required fuel. The existing fuels storage and handling processes and procedures could accommodate activities associated with C-17 operation and maintenance.

4.4.4.2 Mitigation

No significant hazardous materials, hazardous, or stored fuels impacts would be anticipated. Therefore, no mitigation would be required.

4.4.4.3 Cumulative Impacts

The construction contractor for other projects at McChord AFB would comply with applicable regulatory guidance as described for the Alternative Action. When completed, the activities at the other facilities would be managed in accordance with applicable Base plans for hazardous waste, hazardous materials, and stored fuels. No significant hazardous waste, hazardous materials, and stored fuels impacts would be anticipated.

4.4.5 Water Resources

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action in Subchapter 4.3.5.

4.4.5.1 McChord AFB

Surface Water

Runoff from construction areas could contain contaminants that could degrade the quality of receiving waters in Clover and Morey Creeks. The potential for erosion and sedimentation could occur as a result of construction that requires grading or other earthmoving activities during construction of new facilities. These activities could result in soil disturbance and increased erosion and sedimentation that could potentially enter surface waters if not properly managed. Standard erosion control measures to prevent storm water pollution would be incorporated into facility construction and design to minimize soil disturbance, and prevent erosion and sedimentation, at the work site. Measures to prevent discharge of contaminants into surface waters would be followed during construction.

The amount of impervious cover would increase by 267,727 square feet (6.1 acres), which represents about 0.4 percent increase over baseline conditions. Therefore, the amount of storm water runoff should not increase significantly above the existing conditions.

Groundwater

Although there would be an increase in personnel assigned to McChord AFB as a result of the Proposed Action, no effect on groundwater would be anticipated because the Base is not experiencing an overdraft condition. Design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would not worsen the quality of groundwater any site, if encountered. In the

event groundwater is encountered during construction, the construction contractor would temporarily suspend work and notify the Base Environmental Flight.

Floodplains

The Alternative Action at McChord AFB would not require construction of any facilities or structures within floodplain areas associated with Clover or Morey creeks. Two of the 16 construction projects, the proposed composite materials and fiberglass shop (No. 10 on Figure 2.4.3-1) and the proposed avionics facility (No. 14 on Figure 2.4.3-1), would be located in a developed area with adequate drainage systems. These two facilities would be located adjacent to the floodplain associated with Clover Creek. Therefore, impacts to floodplains would not be expected as a result of the Proposed Action.

4.4.5.2 Mitigation

No significant surface and groundwater or floodplain impacts would be anticipated. Therefore, no mitigation would be required.

4.4.5.3 Cumulative Impacts

As with the Alternative Action, the construction contractor for other projects would be required to comply with applicable regulatory requirements and mitigate potentially significant impacts to water resources. When completed, activities at the other facilities would be managed in accordance with the SWPPP for McChord AFB. The Alternative Action would not contribute any cumulative impacts to surface water, groundwater, or flood plains.

4.4.6 Biological Resources

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action in Subchapter 4.3.6.

4.4.6.1 McChord AFB

Construction activities associated with the Alternative Action, as described in Subchapter 2.4.3-2, would occur primarily within the existing developed portion of McChord AFB in areas previously disturbed by construction. New construction associated with the west coast basing of the C-17 at McChord AFB is limited to the industrial/built-up areas, specifically the flightline. The Alternative Action would not result in any adverse effects to vegetation and wildlife at McChord AFB.

4.4.6.2 Military Training Routes

The evaluation of biological resources for MTRs provided in Subchapter 4.3.6.2 for the Proposed Action applies to the Alternative Action. The MTRs for the Alternative Action cover a broad geographic range in Washington and western Idaho. MTRs for the Alternative Action have been evaluated in the EA for C-17 beddown at McChord AFB (USAF 1997).

The Proposed Action would result in additional C-17 aircraft flying operations within existing MTR corridors now in use by aircrews based at McChord AFB. However, the types of operation would be the same as that previously assessed. It is expected that wildlife within these active MTRs have adapted to sights and sounds associated with low-level aircraft overflights. C-17 overflights are infrequent, random, and pose no threat to wildlife along the existing MTRs.

Bird-Aircraft Strike Hazard

Each of the MTRs for the Alternative Action was analyzed for BASH probabilities at biweekly intervals at four daily time periods (dawn, day, dusk, and night) using a 30-year cumulative, nationwide database. Using hazard classifications of the bird-aircraft modeling, each route was ranked by daily time and bi-weekly period into severe, moderate, or low, with each assigned into high, medium, and low subcategories, calculated on grams per kilometer squared. This information is summarized in Subchapter 3.2.11.5.

The potential for BASH incidents are dependent on factors such as time of day and biomass, as described in Subchapter 4.3.6.2. The MTRs for the Alternative Action would avoid severe BASH risk areas.

For the Alternative Action, BASH risks would continue, especially at low altitudes. The BASH risk associated with the Alternative Action would result in a slight increase over current conditions based on the additional C-17 operations within the existing MTRs. It should be noted that the BASH risk factor applies to any aircraft. BASH incidents would be expected to remain constant within the MTRs associated with the Alternative Action. For this reason, the BASH risks associated with the Alternative Action would not be considered significant.

4.4.6.3 Threatened and Endangered Species

McChord AFB

Alternative Action activities would not impact continued existence of the federal and state listed endangered and threatened species occurring on McChord AFB.

Military Training Routes

There are no known impacts of noise or overflight disturbance to threatened and endangered species of plants. Noise impacts to federally listed wildlife species discussed in Subchapter 4.3.6.1 apply. Specific studies involving bald eagles and falcons have shown both to tolerate low-flying jets without short- or long-term behavioral or reproductive impacts (Platt 1977; Ellis 1981; Grubb and Bowerman 1997).

The overflight restrictions for National Parks in Subchapter 4.3.6.1 apply to the Alternative Action. McChord AFB local operating procedures emphasize avoidance of known sensitive areas and guidance provides special warnings regarding periods of bird migrations. Additionally, aircraft are to avoid known nesting sites of federally listed species,

specifically the bald eagle, by 2,000 feet horizontally and 500 feet vertically. The Air Force prepares BASH and bird-aircraft modeling evaluations of the MTRs flown by McChord AFB aircrews to minimize the risk of aircraft bird strikes. Aircrews at McChord AFB and route planners use bird-aircraft modeling data for planning and flying MTRs. The bird-aircraft model considers the BASH risks based on time of day, season, and mission type. Records indicate that no bald eagle, peregrine falcon, then a listed species, or other listed bird-aircraft strikes occurred for at McChord AFB or its MTRs from 1985 to1995.

Use of the MTRs associated with the Alternative Action, including associated noise and visual disturbance would not affect listed plant or wildlife species.

4.4.6.4 Wetlands

The Alternative Action at McChord AFB would not require construction of any facilities in wetlands. The proposed C-17 tire and wheel shop and the proposed avionics facility would be located in a developed area more than 250 feet from Clover Creek. Impacts to wetlands associated with Clover Creek would not be expected.

4.4.6.5 Mitigation

No adverse effects were identified for biological resources. Therefore, no mitigation measures would be required.

4.4.6.6 Cumulative Impacts

The Alternative Action for west coast basing of C-17 aircraft at McChord AFB would contribute to ongoing construction activities within the developed portion of the Base. The Alternative Action would also result in additional C-17 aircraft operations within existing MTRs used by aircrews based at McChord AFB. The Alternative Action would not result in any cumulative impacts that are considered significant.

4.4.7 Socioeconomic Resources

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action at Travis AFB in Subchapter 4.3.7. However, this EA assumes impacts associated with the Alternative Action would occur within Pierce County.

4.4.7.1 McChord AFB

Population

The EIFS Model was used to assess the impacts on population, housing, education and the economy under the proposed action. Under this alternative, which includes the basing and operation of an additional 12 C-17 aircraft, there would be an increase in the local and regional population of 1,500 as a result of a net gain of 574 military and 57 civilian positions. The additional 1,500 persons would be a 0.214 percent increase in population when compared to the 700,820 persons in the Tacoma PMSA. This anticipated population gain includes the

additional military personnel and family members directly affected, and a portion of the additional civilian personnel that would be anticipated to relocate to the area.

Housing

It is anticipated that there would be a demand for approximately 600 housing units as a result of the additional military and civilian personnel under this alternative. Based on current on-Base and off-Base distribution housing occupied by military personnel, approximately two-thirds of this demand would consist of off-Base housing. The Cities of Lakewood, Tacoma, and Puyallup would be most affected. Considering the number of houses listed for sale in the MLS for Pierce County in the $100,000 to $200,000 price range (1,680) and the current apartment vacancy rate (6 percent), the current housing stock supply is more than adequate to accommodate this demand.

Education

The net gain of the military and civilian population under this alternative would result in an increase in local school district enrollments. Assuming a factor of .75 school age children per military household, there would be an enrollment increase of approximately 430 military dependent children in addition to a small number of children from the affected civilian households who are assumed to relocate. It is anticipated that the Clover Park School District would be most affected based on current enrollment distribution of military dependent children. If all of this enrollment increase occurred in the Clover Park School District, the current enrollment would increase by three percent. However, some of the other school districts within Pierce County would absorb some of this enrollment increase.

Economy

Direct and indirect short-and long-term beneficial economic impacts would be realized by the regional and local economy under this alternative. Short-term direct and indirect beneficial economic benefits would result during the construction phase. Likewise, long-term economic benefits would result from operations in the form of wages paid, sales volume and income.

The estimated construction cost (capital costs) for project implementation and annual average income for construction laborers were the inputs used in the execution of the EIFS Model. The estimated construction cost is approximately $124 million over a 4-year period. The region of economic influence is considered to be Pierce, King and Thurston counties.

Since the EIFS economic projections are on an annual basis, the primary model input for construction costs ($124 million) was prorated over an estimated 4-year construction period. As indicated in Table 4.4.7-1, the direct annual regional economic impacts of project construction over this 4-year period would consist of increases of (1) $31,025,000 in business volume (sales); (2) 151 jobs in construction, retail trade, services and industrial sectors; and (3) $3,806,941 in direct personal income. The latter represents the earnings of employees in the retail, wholesale and service establishments who are initially or directly affected by the construction activity, and does not include the construction employment directly involved in

project construction. The increase in business volume reflects increases in the sales of goods, services, and supplies associated with project construction activity.

Table 4.4.7-1 Economic Impact Forecast System: Project Construction and Operation Annual Economic Impacts, Alternative Action at McChord AFB

	Direct Impacts	Indirect Impacts	Total
Construction			
Sales (Business) Volume	$31,025,000	$107,346,500	$138,371,500
Income	$3,806,941	$13,172,020	$16,978,960
Employment	151	522	673
Operations			
Sales (Business) Volume	$11,729,460	$40,583,930	$52,313,390
Income	$24,144,330	$ 4,979,874	$ 29,124,204
Employment	688	197	886

Source: EIFS Model, U.S. Army Construction Engineering Research Laboratories

Table 4.4.7-1 also portrays the indirect annual regional impacts on secondary sales, employment and income generated by the employment and business activity directly associated with project construction. The direct increase in sales and employment generates secondary sales of $107,346,500; creates an additional 522 jobs indirectly in the construction, retail trade, services and industrial sectors; and results in an additional $13,172,020 in indirect income.

Long-term economic benefits would also be realized by operations as a result of the Alternative Action. The primary model inputs for operations are anticipated annual operating expenditures ($1,000,000); estimated operations employment (631); and average annual incomes of $37,900 and $40,255, respectively, for the military and civilian. As indicated in Table 4.4.7-1, the direct annual regional economic impacts of operations consist of increases of: (1) $11,729,460 in business volume (sales); (2) 688 jobs in the retail trade, services and industry sectors; and, (3) $24,144,330 in direct personal income. The latter represents the earnings of employees in the retail, wholesale and service establishments that are initially or directed affected by the operations associated with the proposed action. The increase in business volume reflects increases in the sales of goods, services and supplies associated with project operations.

Table 4.4.7-1 also portrays the indirect annual regional impacts on secondary sales, employment and income generated by the employment and business activity directly associated with operations under the proposed action. The direct increase in sales and employment generates secondary sales of $40,583,930; creates an additional 197 jobs indirectly in the retail trade, services and industry sectors; and results in an additional $4,979,874 in indirect income. Income is indirectly impacted as a result of the indirect increase in sales and employment resulting from the initial economic impacts.

The EIFS Model assessment of the regional economic impacts of project construction, and operations of the Alternative Action at McChord AFB reveals that the RTVs for each of

the four variables were less than the regional RTVs. For this reason, the Alternative Action would not be expected to result in significant annual regional economic impacts during either the construction or the operations phase.

4.4.7.2 Mitigation

No significant population, housing, education, or economic impacts would be anticipated. Therefore, no mitigation would be required.

4.4.7.3 Cumulative Impacts

Six facilities projects would be constructed under the other actions during the same period as the 16 Alternative Action projects would occur. Table 4.4.7-2 summarizes the economic impacts for the cumulative condition. There would be no additional personnel authorizations at McChord AFB as a result of the other actions. Thus, the operations discussion and analysis for the Alternative Action would apply to the cumulative condition and only construction-related cumulative impacts would occur.

Table 4.4.7-2 Cumulative Economic Impacts, McChord AFB

	Direct Impacts	Indirect Impacts	Total
Construction			
Sales (Business) Volume			
Other Actions	$11,634,375	$40,254,938	$51,889,313
Alternative Action	$31,025,000	$107,346,500	$138,371,500
Cumulative Impact	$42,659,375	$147,601,438	$190,260,813
Income			
Other Actions	$1,427,603	$4,939,508	$6,367,111
Alternative Action	$3,806,941	$13,172,020	$16,978,960
Cumulative Impact	$5,234,544	$18,111,528	$23,346,072
Employment			
Other Actions	57	196	253
Alternative Action	151	522	673
Cumulative Impact	208	718	926

With respect to the EIFS Model assessment of the economic impacts of Alternative Action construction cumulative condition, the RTVs for each of the four variables (population, sales volume, income, and employment) were found to be less than the regional RTVs. For this reason, short-term project construction associated with the Alternative Action cumulative condition would not be expected to result in significant annual regional economic impacts.

4.4.8 Cultural Resources

Significance criteria for the cultural resources at McChord AFB would be the same as that stated for the Proposed Action in Subchapter 4.3.8.

4.4.8.1 McChord AFB

Archaeological Resources

No NRHP-eligible archaeological resources are located within or adjacent to the ROI for McChord AFB. The Alternative Action would not result in effects to archaeological resources on McChord AFB. Except for the Air Force office to notify the Washington SHPO instead of the California SHPO, the discussion concerning discovery of an archaeological resource during construction activity in Subchapter 4.3.8.1 applies to the Alternative Action.

Historical Resources

No NRHP-eligible historical resources are located within the ROI for McChord AFB. Construction areas for the Alternative Action would not be located within the McChord Field Historic District. The Alternative Action would not result in effects on historical resources.

Native American Interests

A list of federally recognized Native American tribes and groups identified at the time of preparation of this document is provided in Table 3.1.8-6. Consultation with federally recognized tribes that may be affected by the Alternative Action was completed during preparation of the C-17 Beddown EA for McChord AFB (USAF 1997). No new effects have been identified. The Air Force established a toll-free number that can be used by tribal representatives as well as other organizations to inform the Air Force of concerns regarding C-17 overflights. This open line of communication would continue to be used to inform the Air Force when aircraft overflight may affect tribal activities. The Air Force consulted with Native American groups identified in Table 3.1.8-6 pursuant to 36 CFR 800.2.

4.4.8.2 Military Training Routes

Archaeological Resources

Approximately 58 NRHP-listed archaeological resources were identified within the MTR corridors (see Table 3.2.8-2). The only potential impacts to archaeological resources as a result of operation on the Alternative Action MTRs would be from noise. As discussed in Subchapter 4.3.8, noise from C-17 operation would have no effect on archaeological resources.

Historical Resources

Approximately 441 NRHP-listed historical resources (including districts) were identified within the MTR corridors (see Table 3.2.8-3). The only potential impacts to

cultural resources as a result of operation on the Alternative Action MTRs would be from noise. As discussed in Subchapter 4.3.8, noise from the C-17 would have no effect on prehistoric, historic and architectural resources.

Native American Interests

The consultation process identified for Native American interests in the archaeological resources section above applies.

4.4.8.3 Mitigation

No significant archaeological and historical resources effects have been identified. Therefore, no mitigation measures would be required.

4.4.8.4 Cumulative Impacts

Two other actions planned for McChord AFB, Bldg. 100 renovations and development of the Chapel Center, would be located in the McChord Field Historic District:

- Wing Headquarters (Bldg. 100), the former Air Corps Barracks, has been identified as eligible for the NRHP based on its architecture and historic value; and
- The proposed Chapel Center would be constructed within the former Lanham duplex housing units east of A Street. These units were demolished in accordance with a 1998 Memorandum of Agreement with the Washington SHPO. This area of the Historic District is currently an open space. This project would also require the demolition of two wood-frame buildings.

The renovation of Wing Headquarters (Bldg. 100) and development of a new Chapel Center have been identified in conceptual plans for the McChord Field Historic District. Construction activities associated with these projects would be conducted in accordance with the McChord AFB ICRMP and specific historic preservation requirements identified during the Section 106 consultation process for these separate actions. The Section 106 consultation process for the Alternative Action and associated consultation with Native American interests, would include the other action sites. Thus, when combining the other actions with the Alternative Action, no cumulative adverse cultural resources effects, including visual effects, would be anticipated under the cumulative condition.

4.4.9 Land Use

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action in Subchapter 4.3.9.

4.4.9.1 McChord AFB

On-Base land use conflicts would not be expected under the Alternative Action. Most land uses would be compatible with the general character of established and planned Base land use patterns. The facility construction anticipated under the Alternative Action would be

consistent with existing and future land use plans and programs identified in the McChord AFB General Plan. Facility construction and alteration activities may have a temporary minor constraint on existing operations and land uses; however, after construction, these facilities would not be expected to impact any adjacent land use.

The Alternative Action would slightly increase the noise contours when compared to baseline conditions. The additional noise exposure would occur to the north of the Base in residential land use areas. The slight increase in noise contours would expose approximately 52 acres of additional off-installation residential land uses to the DNL 65-70 dBA noise exposure zone. Although residences are not recommended in these noise zones unless attenuation materials are installed (see Table 3.1.9-1), the number of additionally exposed residences in the DNL 65-70 dBA noise zone would be extremely small when compared to the baseline. Additionally, the condition (*i.e.*, additional residences in the DNL 65-70 dBA noise zone) would be consistent with existing land use in the area because other residences occur in these noise zones under the baseline condition. Therefore, the additional noise exposure from the Alternative Action would not be inconsistent with local land use plans. Although additional residences would be exposed to DNL 65 dBA and greater and this increase would be incompatible according to Air Force AICUZ guidance, the increases would not require the Air Force to update its current AICUZ Study according to AICUZ program guidance. All existing off-Base land uses in the northern CZ and many within the APZs, with the exception of vacant land, are incompatible with AICUZ recommendations. There would be no change to the dimensions of current CZs or APZs at McChord AFB and, therefore, no additional areas would be impacted by AICUZ requirements when compared to baseline conditions. No additional significant land use incompatibilities would be anticipated under the Alternative Action.

4.4.9.2 Military Training Routes

Lands below the MTRs were reviewed to determine if increased aircraft noise or additional MTR operations would affect land uses. Sensitive land uses (*e.g.*, wildlife management areas, parks, residential) would be exposed to increased noise levels between 50 and 60 dBA. However, the increases would be 1 dBA on each route. These resultant noise levels would be well below the DNL noise/land use compatibility guidelines synopsized in (see Table 3.1.9-1). There are numerous recreational/wilderness areas below the MTRs (see Subchapter 3.2.9) where visitors may be annoyed by aircraft overflight. However, based on the sensitive land uses, exposed noise levels and consideration of the noise and overflight studies described in Subchapter 3.1.3, no significant impacts to sensitive land uses would occur because of the slight increase (1 dBA) in noise levels or the additional overflights from the proposed operations. No impacts to land ownership or the existing function of the sensitive land uses would occur.

4.4.9.3 Grant County Airport

Implementation of the Alternative Action would slightly increase noise contours when compared to baseline conditions at the Grant County Airport. Land uses adjacent to the Grant County Airport are predominantly light industrial and agricultural uses. These land uses are

consistent with planned zoning for the area, and the slight increase in noise would not impact land uses. Therefore, land use plans for the local community would not be affected.

4.4.9.4 Mitigation

No significant land use impacts would occur as a result of the Alternative Action. Therefore, no mitigative actions would be required. The local planning agencies could use the noise contours for future land use planning and zoning.

4.4.9.5 Cumulative Impacts

Under the cumulative condition, other facilities would be constructed on McChord AFB and some would be in the general area associated with C-17 basing activities. As with the Alternative Action facilities, the other facility actions would be compatible with the McChord AFB General Plan. Thus, the facility construction anticipated under the cumulative condition would be consistent with existing and future land use plans and programs identified in the General Plan.

4.4.10 Infrastructure and Utilities

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action for Travis AFB in Subchapter 4.3.10.

4.4.10.1 McChord AFB

Water Supply

Under the Alternative Action, there would be a net increase of 631 Air Force active duty, reserve, and civilian personnel. The number of on-Base personnel would increase from 9,850 to 10,481 residents. The average daily per capita consumption for CY 2001 was approximately 119 gal/day (429 million gallons/365 days per year/9,850 people). Assuming the same consumption rate, the net per capita increase in consumption would be about 75,294 gal/day. This represents an increase of about 1.5 percent above the baseline consumption.

In addition to personal use, up to 0.0035 mgd of water per acre may be required for dust control during demolition, construction, and renovation. This water would be supplied by the Base water system. It is estimated dust control water application would occur approximately 115 days per year and that an average of approximately 63.5 acres would be disturbed during the duration of the project. About 0.22 mgd of water would be applied for dust control 115 days per year. Use of 0.22 mgd of water for dust control equates to about 4.5 percent of system capacity. Use of water for dust suppression would end when the demolition and construction activities are completed.

Wastewater Treatment

Under the Alternative Action, there would be a net increase of 631 Air Force active duty, reserve, and civilian personnel. The per capita wastewater generation rate is 81.2 gal per day. Therefore, the net increase in wastewater generation would be about 51,249 gal per day (81.2 gal per day x 631 people). This represents less than 0.7 percent of the permitted capacity of 7.5 MGD.

Storm Water Management

All proposed demolition, construction, and renovation activities would occur within the existing boundaries of the Base. The amount of impervious cover would increase by 267,727 square feet (6.1 acres), an approximate 0.4 percent increase over baseline conditions. Therefore, the amount of storm water runoff should not increase significantly above the existing conditions. The curbs and gutters installed during any street and off-street parking construction would be connected to the existing storm water system to channel runoff to Clover Creek. If required, a new storm water system or connections would be designed and constructed to comply with current regulations and to accommodate any storm water flow increases. Since the amount of disturbed area is greater than 1 acre, a construction permit would be required.

The contractor would ensure a SWPPP is completed and approved before initiating activities. The SWPPP likely would include erosion control techniques that would be used during demolition and construction to minimize erosion. The construction sites would have silt fences and other erosion control features such as absorbent booms for oils and greases down gradient. Hay bales or other absorbent materials would be installed around storm drainage system inlets to prevent sediment or other contaminants from entering the storm water system during the project. The rate of runoff from the construction site would be retarded and controlled mechanically. Diversion ditches would be constructed to retard and divert runoff to protected drainage courses. If site characteristics present the potential for storm water sediment to enter the storm water system, drains in the area would be protected with silt fences, hay bales, or an approved equivalent.

Energy

Implementation of the Alternative Action would result in a slight increase in the demand for energy after completion of the basing action. An additional 267,727 square feet of buildings would be constructed and electricity and natural gas use would increase by 8.3 MW-hours (267,727 square feet x 3.1 x 10^{-5} MW-hours per square foot) and 31.8 KCF (267,727 square feet x 1.12 x10^{-4} KCF per square foot), respectively. The net increase represents 0.01 percent of the baseline conditions. The energy system's capacity is more than adequate to handle the increases as a result of the Alternative Action.

Solid Waste Management

Under the Alternative Action, there would be an estimated 631 additional personnel residing or working on Base. Thus, there would be an increase in solid waste generated by Air Force active duty, reserve, and civilian personnel.

Similar to the Proposed Action, Type IV solid waste would be generated from implementation of the Alternative Action. These wastes would consist of building debris and construction materials such as concrete, metals (roofing, reinforcement bars, conduit, piping, *etc*.), fiberglass (roofing materials and insulation), cardboard, plastics (PVC piping, packaging material, shrink wrap, *etc*.), and lumber. Based on information presented earlier and estimations, 2,767,727 square feet of new facilities would be constructed. The majority of the solid waste, 2,500,000 square feet, would be generated from improvements to the Ramp C parking apron. Based on these data and the assumptions listed above, it is estimated that 5,535 tons of demolition and construction debris would be generated by the Alternative Action.

It is assumed the debris would be disposed in the Puyallup, Washington Landfill. Disposal of demolition, construction, and renovation debris from the Alternative Action would increase the disposal rate at the Puyallup Landfill by approximately 21.3 tons per day over the 12-month period. This rate is conservative and reflects that all waste would be disposed in a landfill. It is assumed the contractor would recycle materials to the maximum extent possible, thereby reducing the amount of construction and demolition debris disposed in the landfill. However, the exact amount of debris cannot be estimated at this time and this analysis assessed the most conservative condition.

Based on the information in Subchapter 3.2.10.5, the landfill has a projected life expectancy of 27 years, with an average disposal rate of 822 tons per day. Based on an average disposal of 260 days per year (*i.e.*, 5 days per week) for 27 years, there would be 7,020 days when construction and demolition debris would be disposed in the landfill. Thus, the total remaining capacity of the landfill is estimated at 5,770,440 tons. The projected disposal from the project (5,535 tons) equates to less than 0.1 percent of the total remaining capacity. Disposal of construction and demolition debris from the Alternative Action would not significantly reduce the life expectancy of the landfill.

Transportation Systems

Impacts would include a temporary increase in construction-related traffic during the construction activities. It is anticipated construction-related traffic would be localized to the specific construction project area as well as the route between the project site and the Base gate. The construction-related traffic would be temporary, lasting as long as the project activity in that area. The Alternative Action would result in a net increase of 631 Air Force active duty, reserve, and civilian personnel (6 percent) at McChord AFB, resulting in a slight increase in weekday on-Base roadway volumes. The Base transportation network is sufficient to handle the baseline requirements and is capable of accommodating the slight increase (estimated at 6 percent) in on-Base traffic as a result of the Alternative Action. It is

anticipated that vehicular traffic at the Base gates would be acceptable, with no substantial change in volumes from baseline conditions. No substantial change in traffic congestion would be expected as a result of the Alternative Action.

4.4.10.2 Mitigation

No significant impacts would be anticipated. Therefore, no mitigation would be required.

4.4.10.3 Cumulative Impacts

No additional personnel would be assigned to McChord AFB under the other actions. Water consumption would be as described for the Alternative Action.

Construction projects associated with the other actions would increase project-related water use as described for the Alternative Action. It is estimated dust control water application would occur approximately 115 days per year and that an average of approximately 83.9 acres (3,654,343 square feet / 43,560 square feet per acre) would be disturbed during the duration of the project for new construction and demolition projects. About 0.29 mgd of water would be applied for dust control 115 days per year. Use of 0.29 mgd of water for dust control equates to about 6 percent of system capacity. Use of water for dust suppression would end when the demolition and construction activities are completed.

Wastewater Treatment

No additional personnel would be assigned to McChord AFB under the other actions. Water usage would be as described for the Alternative Action.

Storm Water Management

There would be an overall increase in impervious cover, which would result in an increase in impervious cover from the Alternative Actions and other actions. The amount of impervious cover would increase by 1,074,107 square feet (24.7 acres), which represents about 1.5 percent increase over baseline conditions. Two projects (Ramp C Parking Apron Improvement project for the Alternative Action and a cross Base highway project for other actions) are not included in the calculations since these areas are not considered new impervious areas. Discussion for the Alternative Action would apply to the other facilities sites. With implementation of control devices, no cumulative significant storm water impacts would be anticipated from implementation of the Alternative Action and other actions.

Energy

Twenty-two facilities would be constructed, one renovated, and 14 others demolished under the other actions. One of the facilities to be constructed would replace one being demolished. Two of the projects would involve roadwork and therefore are not included in the energy calculations. Cumulative actions would result in a slight increase in the demand

for energy after the Alternative Action and other action facilities projects are completed. The net amount of building space to be constructed is 854,821 square feet (1,045,070 square feet of new facilities – 190,249 square feet of demolished buildings). The amount of electricity and natural gas use would increase by 26.5 MW-hours (854,821 square feet x 3.1 x 10^{-5} MW-hours per square foot) and 101.4-KCF (854,021 square feet x 1.12 x10^{-4}-KCF per square foot), respectively. The net increase represents 0.03 percent of the baseline conditions. The energy system's capacity is more than adequate to handle increases from implementation of the Alternative Action and other actions.

Solid Waste Management

A total of about 6,279,751 square feet of facility space (including new road projects) would be constructed under other actions, and 190,249 square feet would be demolished. Based on these data and the assumptions listed in paragraph 4.3.10.1, it is estimated that 15,382 tons of debris would be generated by the other actions. Disposal of demolition, construction, and renovation debris from the other actions would increase the disposal rate at the Puyallup Landfill by an average 39.4 tons per day over an average of 18-month period. This rate is conservative and reflects that all waste would be disposed in a landfill. It is assumed the contractor would recycle materials to the maximum extent possible, thereby reducing the amount of construction and demolition debris disposed in the landfill. However, the exact amount of debris cannot be estimated at this time and this analysis assessed the most conservative condition.

Based on the information in Subchapter 3.2.10.5, the landfill has a remaining projected life expectancy of 27 years, with an average disposal rate of 822 tons per day. Based on an average disposal of 260 days per year (*i.e.*, 5 days per week) for 27 years, there would be 7,020 days when construction and demolition debris would be disposed in the landfill. Thus, the total remaining capacity of the landfill is estimated at 5,770,440 tons. The projected disposal from the project (15,382 tons) equates to less than 0.3 percent of the total remaining capacity. Disposal of construction and demolition debris from the Alternative Action would not significantly reduce the life expectancy of the landfill.

Transportation

Construction projects associated with the other actions would increase project-related traffic as described for the Alternative Action. Since some of the other actions are in the same area as the Alternative Action construction activities, there could be a slight cumulative increase in traffic. As with the Alternative Action, the construction-related traffic would be temporary, lasting as long as the project activity in that area. No additional personnel would be assigned to McChord AFB under the other actions. Therefore, the traffic analysis for the Alternative Action for personnel applies to the cumulative condition. No substantial change in traffic congestion would be expected as a result of the cumulative condition.

4.4.11 Airspace and Airfield Operations

Significance criteria for the Alternative Action at McChord AFB and the Grant County Airport would be the same as that stated for the Proposed Action in Subchapter 4.3.11.

4.4.11.1 McChord AFB

Airspace Operations

The C-17 sortie aircraft operations and airspace requirements associated with the Alternative Action would be consistent with the baseline operations. The number of C-17 operations within the airspace would increase from a baseline of about 3,840 annual operations (11 per day) to 4,800 operations (13 per day) under the alternative. The existing air traffic control procedures and airspace infrastructure surrounding McChord AFB have the capability to accommodate the two additional daily C-17 operations. The low altitude federal airways and MTRs that transit ROI airspace would not be impacted, nor would they affect the increased level of operations in the airspace.

Airfield Operations

Under the Alternative Action, average daily airfield operations at McChord AFB would increase by 15.23 operations from 91.62 to 106.85 operations (see Tables 2.4.1-3 and 2.4.3-1, respectively). The airfield has the capacity to accommodate this level of operations. The existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional C-17 operations at McChord AFB.

4.4.11.2 Grant County Airport

Airspace Operations

The number of C-17 sortie aircraft operations in the airspace surrounding the Grant County Airport would increase from the baseline of about 2,867 operations (8 per day) to 3,583 operations (10 per day) under the alternative. The total number of operations within the airspace includes airfield operations as well as operations on MTRs near the airport. The existing air traffic control procedures and airspace infrastructure surrounding Grant County Airport has the capability to accommodate the two additional daily C-17 operations. The low altitude federal airways and MTRs that transit ROI airspace would not be impacted, nor would they affect, the increased level of operations in the airspace.

Airfield Operations

Under the Alternative Action, average daily airfield operations at the Grant County Airport would increase by 28.63 operations from 418.41 to 447.04 operations (see Tables 2.4.1-4 and 2.4.3-2, respectively). The airfield has the capacity to accommodate this level of operations. The existing aircraft ground tracks, pattern altitudes, and instrument

approach procedures, as well as the air traffic control procedures, are compatible with the requirements associated with the additional C-17 operations at the Grant County Airport.

4.4.11.3 Military Training Routes

The combined annual number of sortie aircraft operations McChord C-17 aircrews would fly on the MTRs would increase from 3,200 operations (266 per month) to 4,000 operations (334 per month). The C-17 aircrews would operate on the MTRs under the Alternative Action using the same techniques and procedures that were assessed for C-17 operations on the MTRs in the McChord C-17 Beddown EA. Likewise, there would be no change to the structure (*i.e.*, entry and exit points, altitudes, corridor widths, route points, *etc.*) of any of the nine MTRs. The routes and associated airspace, as well as the route use notification, position reporting, and control procedures for aircraft on the routes and in adjacent airspace assessed in the McChord C-17 Beddown EA, would accommodate the additional 800 annual (68 monthly) MTR operations. The proposed MTR operations would not place significant demands on, nor impact, airspace infrastructure.

The airspace management and procedures discussion and analysis for the Proposed Action apply to the Alternative Action. In summary, each MTR has the capacity to accommodate the additional operations associated with the Alternative Action, and the structure for each route can support C-17 operations. The potential for conflict between aircraft operating on the MTRs as well as other civil aircraft operating in the airspace around the MTRs is low because the existing scheduling and air traffic control procedures are designed to deconflict aircraft.

4.4.11.4 Aircraft Safety

It is impossible to predict the precise location of an aircraft accident. However, aircraft flight tracks are developed to avoid overflying residences and built-up areas to the maximum extent practicable. As mentioned in Chapter 3, 68 percent of Air Force aircraft accidents that occur within a 10-NM radius of an airfield happen either on the airfield or within an area that is 3,000 feet wide and extends out to a distance of 15,000 feet from the end of the runway. Historical data show that large aircraft such as the C-17, C-5, and KC-10 would have lower probability of being involved in an accident within the 10-NM radius (20 percent) when compared to fighter and trainer aircraft (80 percent). The types of landing and takeoff operations the C-17aircraft would accomplish at McChord AFB and Grant County Airport, as well as the MTR operations, would be consistent with those flown over the lifetime for each aircraft. Thus, it is anticipated the mishap distribution discussed in Subchapter 3.1.11.4 for takeoffs and landings, as well as the baseline Class A mishap rates for all phases of flight (see Table 3.2.11-3), would apply to the C-17 operations anticipated under the Alternative Action. For these reasons, the probability is low that an aircraft involved in an accident at or around the McChord AFB and Grant county Airport airfields or on a MTR would strike a person or structure on the ground.

4.4.11.5 Bird-Aircraft Strike Hazard

The bird-aircraft strike assessment factors for the Proposed Action in Subchapter 4.3.11.4 apply to the Alternative Action. Likewise, the bird-aircraft strike fluctuation and bird-aircraft strikes-serious mishap information for the Proposed Action apply.

Overall, it is estimated the total flying hours for McChord AFB's C-17s within the ROI airspace would increase under the Alternative Action by about 25 percent when compared to the baseline. Thus, bird-aircraft strikes associated with airfield operations at McChord AFB would be expected to increase commensurate with the change in flying hours. Based on the data in Subchapter 3.2.11.5, it is estimated that about 31 bird-aircraft strikes would occur for a 1-year period in the area around the airfield.

Thus, there is no statistical data for use in estimating bird-aircraft strikes for the Proposed Action MTR operations. Air Force-wide, 5,902 bird-aircraft strikes occurred during MTR operations in 2002 (USAF 2003e) during at total of 1,127,064 flying hours (USAF 2003f), or a rate of 0.0052 strikes per flying hour. McChord AFB aircrews fly approximately 1,766 hours annually on MTRs under the baseline condition. It is estimated that the hours flown on MTRs would increase by 25 percent to 2,354 hours annually. Using this estimate of flying time and the Air Force-wide data for 2002, it is anticipated that about five bird-aircraft strikes would occur annually from McChord AFB C-17 MTR operations.

It is unlikely that any of these bird-aircraft strike incidents would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).

4.4.11.6 Mitigation

No significant airspace and airfield operations, aircraft safety, or BASH impacts would be anticipated. Thus, no mitigation would be required.

4.4.11.7 Cumulative Impacts

None of the other actions anticipated at McChord AFB involve aircraft operations. Therefore, no cumulative impacts would be anticipated.

4.4.12 Environmental Management

Significance criteria for the Alternative Action at McChord AFB would be the same as that stated for the Proposed Action at Travis AFB in Subchapter 4.3.12.

4.4.12.1 McChord AFB

Pollution Prevention

The Alternative Action would result in construction of new facilities and the introduction of 12 additional C-17 aircraft at McChord AFB. The activities associated with

the action would be accomplished under existing Air Force and Base directives, as well as innovative pollution prevention technologies, to achieve the P2 goals of minimizing or eliminating the use of hazardous materials, reducing the volume of hazardous wastes and the release of pollution into the environment, and conserving energy.

Asbestos and Lead-based Paint

It is possible that asbestos and LBP could be encountered in older buildings that would be demolished. The demolition contractor would be responsible for ACM and LBP removal. The procedures identified for ACM and LBP abatement for the Proposed Action at Travis AFB would be used for the Alternative Action at McChord AFB. The proposed facilities would be constructed or renovated without any ACM and LBP.

Environmental Restoration Program

The Alternative Action would require construction activities at various locations on McChord AFB. Proposed construction of two nose docks, the Squadron Operations/Aircraft maintenance unit, and the Engine Facility would be located in areas identified as ERP sites. Proposed construction of the AGE/Storage Facility, Tire and Wheel Shop, and Munitions Facility would be located adjacent to ERP sites. Design and construction activities would be coordinated with the Base Environmental Flight and Bioenvironmental Engineering to ensure that construction would avoid interference with any ongoing investigation and remediation work and would not worsen the condition of any site. Before construction activities begin, the contractor would be required to coordinate with the Environmental Flight and prepare a work plan and health and safety plan in case contamination is encountered during excavation activities. The work plan and health and safety plan would address measures for using field instruments capable of detecting contaminants at harmful levels.

Geology

New facilities construction under the Alternative Action would not result in any substantial changes to physiographic features. Sites would be cleared and stabilized to enable construction of foundations and structures. No change in the site elevation would be anticipated. Alteration of ground surface would be minimal. Facility design and construction would incorporate recommendations of a site-specific geotechnical investigation, as appropriate.

Soils

Construction activity under the Alternative Action would occur within an area in which the soils have been disturbed and modified by prior construction. The contractor would ensure that an SWPPP is completed and approved before initiating activities. The SWPPP likely would include erosion control techniques that would be used during demolition and construction to minimize erosion.

Earthwork would be planned and conducted in such a manner to minimize the duration of exposure of unprotected soils. Side slopes and back slopes would be protected

immediately upon completion of rough grading. Protection would be provided by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Slopes too steep for stabilization by other means would be stabilized by hydroseeding, mulch anchored in place, covering by anchored netting, sodding, or such combination of these and other methods as may be necessary for effective erosion control. Use of best management practices such as rock berms, silt fences, and single point construction entries would minimize erosion during demolition and construction. Grass and other landscaping would be reestablished in the disturbed areas immediately after completion of construction, thereby reducing the potential for erosion. For these reasons, no significant soils impacts would be expected.

The Alternative Action would result in removal of topsoil for construction of the proposed facilities and structures. Any topsoil removed from the site would be replaced at other locations upon completion of the project.

4.4.12.2 Mitigation

No significant pollution prevention, ERP, geology, or soils impacts would be anticipated. For this reason, no mitigation measures would be required.

4.4.12.3 Cumulative Impacts

The construction contractor for other projects would be required to comply with the regulatory requirements and best management practices identified for the Alternative Action. Although some of the other actions are adjacent to Alternative Action project sites, use of the regulatory requirements and best management practices identified for the Proposed Action would minimize the potential for cumulative impacts. When completed, activities at the other facilities would be managed in accordance with applicable environmental plans and policies. No cumulative pollution prevention, asbestos and LBP management, ERP, geology, or soils impacts would be anticipated.

4.5 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action.

Air Quality

The emission of air pollutants associated with facilities construction and aircraft operation is an unavoidable condition, but is not considered significant and a Clean Air Act General Conformity Determination would not be required.

Noise

Noise resulting from anticipated aircraft operations is an unavoidable condition. The C-17 is a quieter aircraft than the C-5. However, sleep disturbance, annoyance, and speech interference may occur for both the Proposed Action and Alternative Action. However, hearing impairment is not expected. Noise would not be considered a significant impact.

Environmental Management

The loss of aggregate, which would become inaccessible, would occur as a result of the construction activities. However, due to the potential for reuse of this material on site, the relatively small portion of the resource area affected and the low economic value of aggregate in the areas, this condition would not be considered significant. Earthquake-related hazards, including ground shaking and high ground accelerations that may cause damage to new facilities would be an unavoidable condition.

Biological Resources

Site grading associated with construction projects would remove minimal vegetation and associated small animal life now occupying or utilizing the few acres affected. All of the affected sites are in the areas of the bases that were previously disturbed and would not presently provide significant habitat for many species. Plants and wildlife would be extirpated from the site, decreasing site floral and faunal diversity. Although unavoidable, this adverse condition would not be considered significant.

Safety

The potential for aircraft mishaps, the potential for accidents or spills at the fuel storage facility, and the generation of hazardous wastes are unavoidable conditions associated with the proposed action. However, the potential for these unavoidable situations would not significantly increase over baseline conditions, and therefore would not be considered significant.

Infrastructure and Utilities

The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action and Alternative Action would require use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or Alternative Action.

4.6 RELATIONSHIP BETWEEN SHORT-TERM USES AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Neither the Proposed Action nor the Alternative Action would result in intensification of land use in the area surrounding the respective Base. Development of the Proposed Action, Alternative Action, or No Action Alternative would not represent a significant loss of open space. The sites are designated for aviation uses, and were not planned for use as open space. Therefore, it is not anticipated that the Proposed Action, Alternative Action, or No Action Alternative would result in any cumulative land use or aesthetic impacts. Long-term productivity of the sites would be increased by development of the Proposed Action or the Alternative Action.

Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action, Alternative Action, or No Action Alternative involve consumption of material resources, energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Material Resources

Building materials (for construction of facilities), concrete and asphalt (for facilities, runways, and roads), and various material supplies (for infrastructure) would be used for the Proposed or Alternative Action. Most of the these materials are not in short supply, and are readily available from suppliers in the region. Use of these materials for the proposed action would not limit other unrelated construction activities.

Energy Resources

Energy resources such as petroleum-based products (such as gasoline, jet fuel, and diesel), natural gas, and electricity would be used for the Proposed or Alternative Actions and would be irretrievably lost. Gasoline and diesel would be used for operation of construction vehicles. Jet fuel would be used for aircraft operations and gasoline would be used for vehicle operation. Natural gas and electricity would be used to operate facilities. Consumption of these energy resources would not place a significant demand on their supply systems or within the region.

Land

Implementation of either the Proposed or Alternative Actions would result in construction of new facilities on the respective Base. This land would be lost to other uses during the operational life of the beddown action. The loss of open space is not considered irreversible.

Biological Habitat

The Proposed Action or Alternative Action would result in the irreversible destruction or loss of the vegetation and wildlife habitat on proposed construction sites. Neither action would remove a significant amount of open space or undeveloped land currently functioning as biological habitat.

Human Resources

The use of human resources for construction and operation is considered an irretrievable loss only in that it would preclude the affected personnel from engaging in other work activities. However, the use of human resources for either the Proposed Action or Alternative Action represents employment opportunities, and is considered beneficial.

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APPENDIX A
AIR FORCE FORM 813

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REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

Report Control Symbol
RCS:

INSTRUCTIONS: *Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function)*	2. FROM *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
HQ AMC/CEV 507 Symington Dr., Scott AFB, IL 62225-5022	HQ AMC/XPP 402 Scott Drive, Unit 3L3 Scott AFB, IL 62225-5022	229-2251

ORIGINAL

3. TITLE OF PROPOSED ACTION
Proposed C-17 Aircraft Basing Action on the West Coast

4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*
(see attached)

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*
(see attached)

6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE
GLENN A. MACKEY, Colonel, USAF Chief, Operational Programming Division		27 June 02

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. *(Check appropriate box and describe potential environmental effects including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U = unknown effect)*

	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*				X
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)*				X
9. WATER RESOURCES *(Quality, quantity, source, etc.)*				X
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, bird/wildlife aircraft hazard, etc.)*				X
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)*				X
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, threatened or endangered species, etc.)*				X
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, historical, etc.)*				X
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)*				X
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*				X
16. OTHER *(Potential impacts not addressed above.)*				

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. [ ] PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION (CATEX) # _____ ; OR
[X] PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION *(Name and Grade)*	19a. SIGNATURE	19b. DATE
BOBBIE L. GRIFFIN, Lt Col, USAF Chief, Environmental Programs Division		28 JUNE 2002

4.0 PURPOSE AND NEED FOR ACTION

HQ AMC proposes to base 12 primary assigned aircraft (PAA) C-17 Globemaster III aircraft at a West Coast active duty base. This action is required for C-17 aircrews and aircraft to remain proficient in strategic and tactical airlift to support worldwide mobility requirements. If this proposed action is implemented, C-17 aircrews will support DOD airlift requirements in both the CONUS and OCONUS.

4.1 Purpose of the Action

According to the 15 Apr 02 Mobility Force Structure Briefing to Congress, the USAF will acquire additional C-17 aircraft over the next 10 years to replace aging C-141 aircraft, realign C-5 aircraft to the Air Reserve Component (ARC), and allow the Air Force to address the increasing demand for airlift with newer, more reliable aircraft and improved overall support. This proposed action is necessary, as the maintenance costs and downtime have increased with the age of the aircraft. This action will ensure that operational aircraft and proficient aircrews are available to support the AMC airlift mission.

4.2 Need for the Action

The age of the current airlift fleet of C-141, C-130 and C-5 aircraft requires the Air Force to replace or realign aircraft as the maintenance costs and downtime increase with the age of the aircraft. The 15 April 02, Mobility Force Structure Briefing to Congress shows that over the next 8-10 years, C-17 aircraft will join the Air Force fleet as older aircraft are retired. The AF has determined that it is operationally prudent to maintain a robust airlift capability on the West Coast in order to achieve the airlift requirement of 54.5 million ton-miles per day; an objective established because of the Mobility Requirements Study 05.

Further, follow-on airlift assets are required at a western gateway to the Pacific region in order to comply with the current airlift concept of operations and maximize efficiency. This action will maximize utility of the newly acquired force structure and will enable the AF to accept aircraft delivery in accordance with the expected production schedule of 15 aircraft per year for FY02 to FY08. The evolving airlift strategy requires additional C-17s and the age of the existing fleet dictates the urgency of this action. This plan supports the transfer of C-5 aircraft to the ARC and transformation of the active duty mission of a major mobility hub from solely strategic to one of strategic and tactical capability.

Basing C-17 aircraft at a West Coast location will enhance AF capability to meet the National Military Strategy by modernizing strategic and tactical airlift at an active AMC installation with an Associate Reserve unit. Further, a West Coast hub will serve to balance these modern airlift assets between the East and West Coasts both in physical location and within the AF unit structure. The proposed action will place the aircraft within 15th Air Force, which will more closely balance the number of assets already scheduled for 21st Air Force on the East Coast.

Two factors affecting the timing of the proposed action are the military construction process and production schedule from the aircraft manufacturer. The military construction processes requires a multi-year effort for programming funds, designs, and construction of support facilities.

4.3 Related EISs/EAs and Other Documents

- EA for C-17 Basing Action at McChord AFB, FONSI signed March 1997
- Draft EA for Lewiston, ID Airport use as a C-17 ALZ
- Draft EA for Tactical Approach and Departures, Extended Training Hours for C-17 Aircraft, McChord AFB
- EA for C-17 Basing Action at McGuire AFB, FONSI signed 17 Apr 02

5.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

5.1 Description of the Proposed Action

HQ AMC plans to base 12 C-17 aircraft and 625 military and AF civilian personnel on the West Coast of the United States to maintain proficiency in both tactical and strategic airlift within the CONUS and overseas in support of DOD requirements. In the preferred alternative, 16 C-5 aircraft would be removed from Travis AFB, resulting in a net loss of 161 military and AF civilian personnel. The C-17 unit will use current MTRs with the possibility of some additional routes. One ALZ will also be used to maintain proficiency.

5.2 Anticipated Environmental Issues

The effect of noise from aircraft operations will require analysis and the impact to air quality will require an Air Conformity Analysis to ensure the emissions are within the SIP. An analysis of the impact to any state or federal threatened and endangered species as well as an analysis on the impact of cultural resources is required for any facility project requirements and for all low-level training routes.

5.3 Design, Evaluation, and Selection Criteria

West Coast basing of the C-17 will enhance AMC's worldwide deployment capability. It will place aircraft and aircrew close to the Pacific theatre and support the 15th AF mission in all states west of the Mississippi River. The bases considered for this action must have adequate existing facilities or space for the construction of aircraft parking, maintenance and operations work space, and emergency response facilities and equipment to support the safe operation of the C-17 aircraft. The installation must have an operational runway. It is highly desirable to have an existing ARC unit at the installation to maximize the employment opportunity of the modern C-17 aircraft. In order to maximize efficiency and economies of scale, the C-17s will be based at an installation with an airlift mission, avoiding dissimilar missions at a single location. While the primary objective is modernizing airlift, a corollary consideration is the maintenance of the current unit structure. The intent is to avoid the creation or dissolution of any unit, thus avoiding the associated cost.

5.4 Description of Alternatives

5.4.1 No-Action Alternative

Under the No-Action Alternative AMC would continue operating the current airlift fleet on the West Coast until aircraft retire or are realigned because of age. The current airlift fleet if not upgraded would have difficulty supporting a robust airlift capability on the West Coast as required by the National Military Strategy. AMC would receive the C-17 aircraft under the existing production schedule.

5.4.2 Preferred Alternative

Base 12 C-17 aircraft and 625 personnel at Travis AFB to maintain proficiency and conduct both tactical and strategic airlift within the CONUS and overseas in support of DOD requirements. The C-17 unit will use current MTRs and an ALZ at a location yet determined to maintain proficiency. Development of new MTRs may be required if adequate routes are unavailable.

5.4.3 Other Reasonable Alternatives

- Additional C-17 aircraft and aircrews to McChord AFB.

5.4.4 Other Alternatives Identified But Not Considered

- C-17 aircraft and aircrews to March Air Reserve Base
- C-17 aircraft and aircrews to Fairchild Air Force Base
- Delay receiving the new aircraft

5.5 List of Required Permits

A review has not yet been done to determine the required permits and licenses.

5.6 Recommended Level of Documentation

The C-17 basing at Charleston, McChord, and McGuire AFBs have required an Environmental Analysis resulting in a Finding of No Significant Impact (FONSI). A similar analysis for basing additional C-17 aircraft on the West Coast will most likely result in a FONSI. A conformity analysis is possible.

APPENDIX B
PROPOSED ACTION MILITARY TRAINING ROUTE DATA

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B-9 IR-212

IR212 is a six-segment, 135 mile-long route which begins east of San Bernardino, California and proceeds to the north and then northwest and west, terminating north of Ridgecrest, California. The route was flown 10 times in FY02. Table B-9-1 lists the route structure data, and Table B-9-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-9 depicts IR212. Table B-9-3 lists the operations for the MTR in 2002.

Table B-9-1 IR-212

Originating/Scheduling Activity: 3rd Marine Aircraft Wing, San Diego, CA Hours of Operation: Continuous					
Route Description					
Point	***Altitude Data (100 FT)***	***Route Width (NM)***	***Length (NM)***	***Latitude***	***Longitude***
A (Entry Point)		5LT – 5 RT		N34°16.00'	W116°27.00'
B	02 AGL – 70 MSL	5LT – 5 RT	30	N34°46.00'	W116°33.00'
C	02 AGL – 70 MSL	3LT – 3RT	20	N34°55.00'	W116°11.00'
D	02 AGL – 70 MSL	3LT – 3RT	25	N35°16.00'	W115°54.00'
E	02 AGL – 80 MSL	3LT – 3RT	29	N35°38.00'	W116°17.00'
F	30 AGL – 80 MSL	3LT – 3RT	20	N35°44.00'	W116°41.00'
G (Exit Point)	02 AGL – 80 MSL	3LT – 3RT	11	N35°43.00'	W116°55.00'
			135		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-9-2 IR-212

Federal Airways	*Military Training Routes*	*Airports*
V-21	VR-1218	Baker
V-283	VR-1265	
V-587	VR-1217	
V-394	VR-1214	

Table B-9-3 Annual Operations on IR 212 in 2002

Aircraft Type	Day	Night	Total
T-45	8	0	8
F/A-18	2	0	2
Total	10	0	10

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Source: 3 Maw 2003.

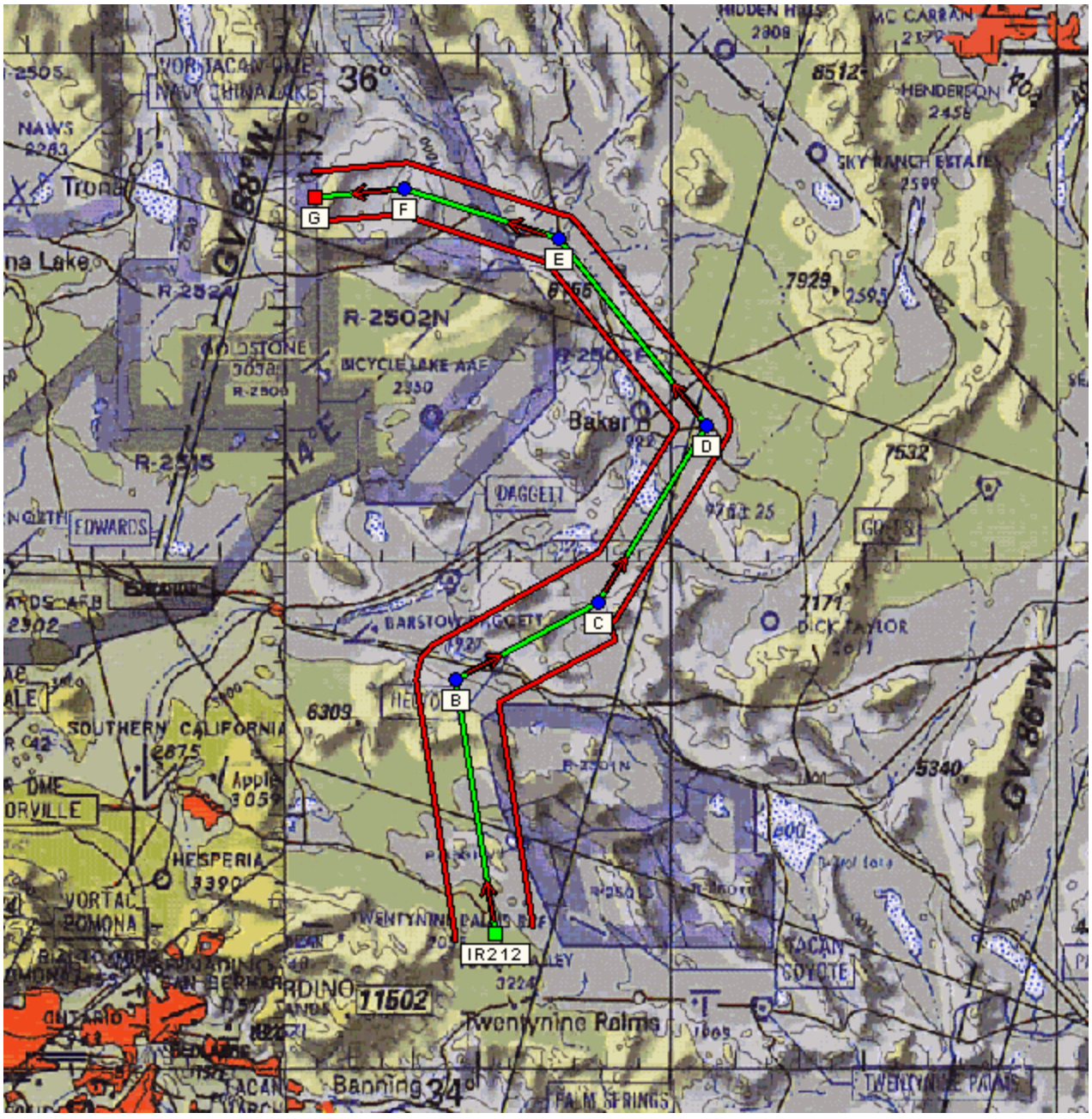


Figure B-9 IR-212

B-10 IR-236

IR236 is a 16-segment, 320 mile-long route which begins north of Edwards AFB, California and proceeds to the west, then northward before turning to the east and the south, terminating north of the base. The route was not flown in FY02. Table B-10-1 lists the route structure data and Table B-10-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-10 depicts IR236. The route was not flown in 2002 (FAA 2003a).

Table B-10-1 IR-236

Originating/Scheduling Activity: AFFTC, Edwards AFB, CA
Hours of Operation: 0600-2200 local, daily

Route Description

Point	Altitude Data (100 FT)	Route Width (NM)	Length (NM)	Latitude	Longitude
A (Entry Point)		2 LT – 2 RT		N35°07.50’	W117°36.30’
B	02 AGL - 50 MSL	2 LT – 2 RT	21	N35°01.30’	W118°01.30’
C	02 AGL – 55 MSL	2 LT – 2 RT	11	N35°10.50’	W118°08.50’
D	02 AGL - 105 MSL	3 LT – 1 RT	24	N35°31.30’	W118°23.80’
E	02 AGL - 100 MSL	3 LT – 1 RT	9	N35°38.80’	W118°28.80’
F	02 AGL - 100 MSL	2 LT – 2 RT	9	N35°47.40’	W118°28.80’
G	02 AGL - 105 MSL	2 LT – 2 RT	20	N36°07.60’	W118°27.30’
H	02 AGL - 145 MSL	2 LT – 2 RT	37	N36°28.00’	W117°49.30’
I	02 AGL - 135 MSL	1 LT – 4 RT	32	N36°56.20’	W118°08.00’
J	02 AGL - 130 MSL	1 LT – 4 RT	8	N37°03.00’	W118°12.50’
K	02 AGL - 130 MSL	2 LT – 2 RT	12	N37°05.60’	W117°57.30’
L	02 AGL – 90 MSL	2 LT – 2 RT	11	N37°07.30’	W117°43.40’
M	02 AGL - 100 MSL	2 LT – 2 RT	26	N36°41.80’	W117°48.70’
N	02 AGL - 100 MSL	2 LT – 2 RT	26	N36°24.10’	W117°24.50’
O	02 AGL – 75 MSL	2 LT – 2 RT	23	N36°02.00’	W117°16.10’
P	02 AGL – 80 MSL	2 LT – 2 RT	25	N35°38.50’	W117°04.50’
Q (Exit Point)	02 AGL - 75 MSL	2 LT – 2 RT	26	N35°15.80’	W117°19.80’
			320		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-10-2 IR236

Federal Airways	*Military Training Routes*	*Airports*
None	VR-1217	
	VR-1255	
	VR-1205	

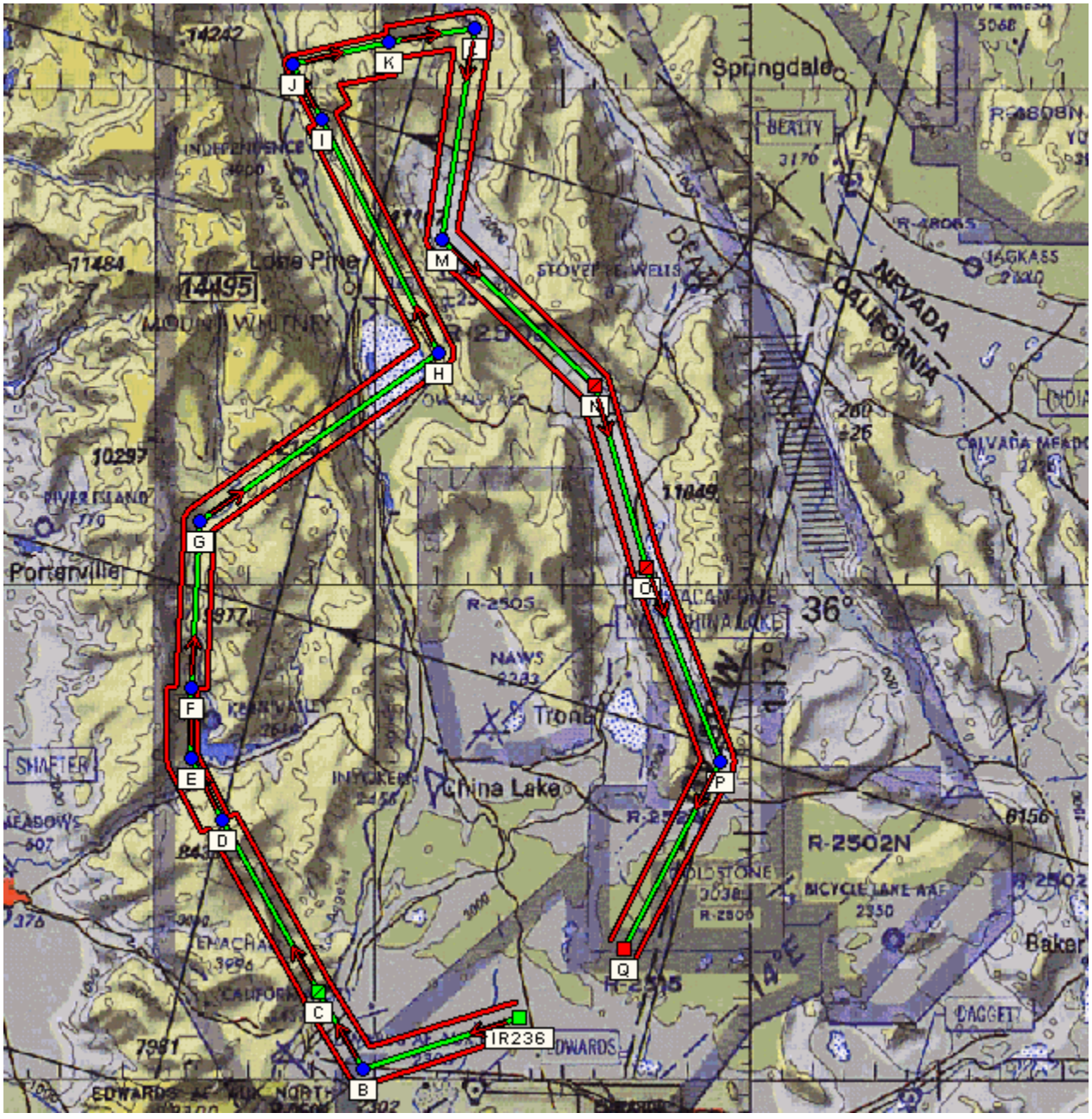


Figure B-10 IR-236

B-11 VR-201

VR201 is an eight-segment, 168 mile-long route which begins in California northwest of Bishop and proceeds to north-northeastward, terminating northeast of Reno, Nevada. The route was flown 228 times in FY02. Table B-11-1 lists the route structure data and Table B-11-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-11 depicts VR201. Table B-11-3 lists the operations for the MTR in 2002.

Table B-11-1 VR-201

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA **Hours of Operation: Daylight Hours, Other Times by NOTAM**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		6 LT – 6 RT		N38°01.00’	W119°01.00’
B	02 AGL – 100 MSL	6 LT – 6 RT	21	N38°20.00’	W119°13.00’
C	02 AGL – 120 MSL	6 LT – 6 RT	32	N38°47.00’	W118°50.00’
D	02 AGL – 90 MSL	6 LT – 6 RT	32	N39°17.00’	W119°04.00’
E	02 AGL – 90 MSL	6 LT – 6 RT	16	N39°32.00’	W119°11.00’
F	02 AGL – 60 MSL	2 LT – 2 RT	14	N39°42.00’	W118°59.00’
G	02 AGL – 60 MSL	2 LT – 2 RT	36	N40°03.50’	W118°22.00’
H	02 AGL – 60 MSL	2 LT – 2 RT	10	N40°01.00’	W118°09.00’
I (Exit Point)	02 AGL – 60 MSL	2 LT – 2 RT	7	N39°56.00’	W118°14.50’
			168		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-11-2 VR-201

Federal Airways	*Military Training Routes*	*Airports*
V-494	VR-1255	Bridgeport
V-105	IR-207	
V-564	VR-1250	
V-32	VR-1251	
	VR-1254	

Table B-11-3 Annual Operations on VR-201 in 2002

Aircraft Type	Day	Night	Total
F/A-18	87	0	87
T-38	5	0	5
F-5	9	0	9
S-3	55	0	55
F-15	11	0	11
T-45	9	0	9
EA-6B	50	0	50
Total	228	0	228

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m. Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations. Source: FAA 2003a.

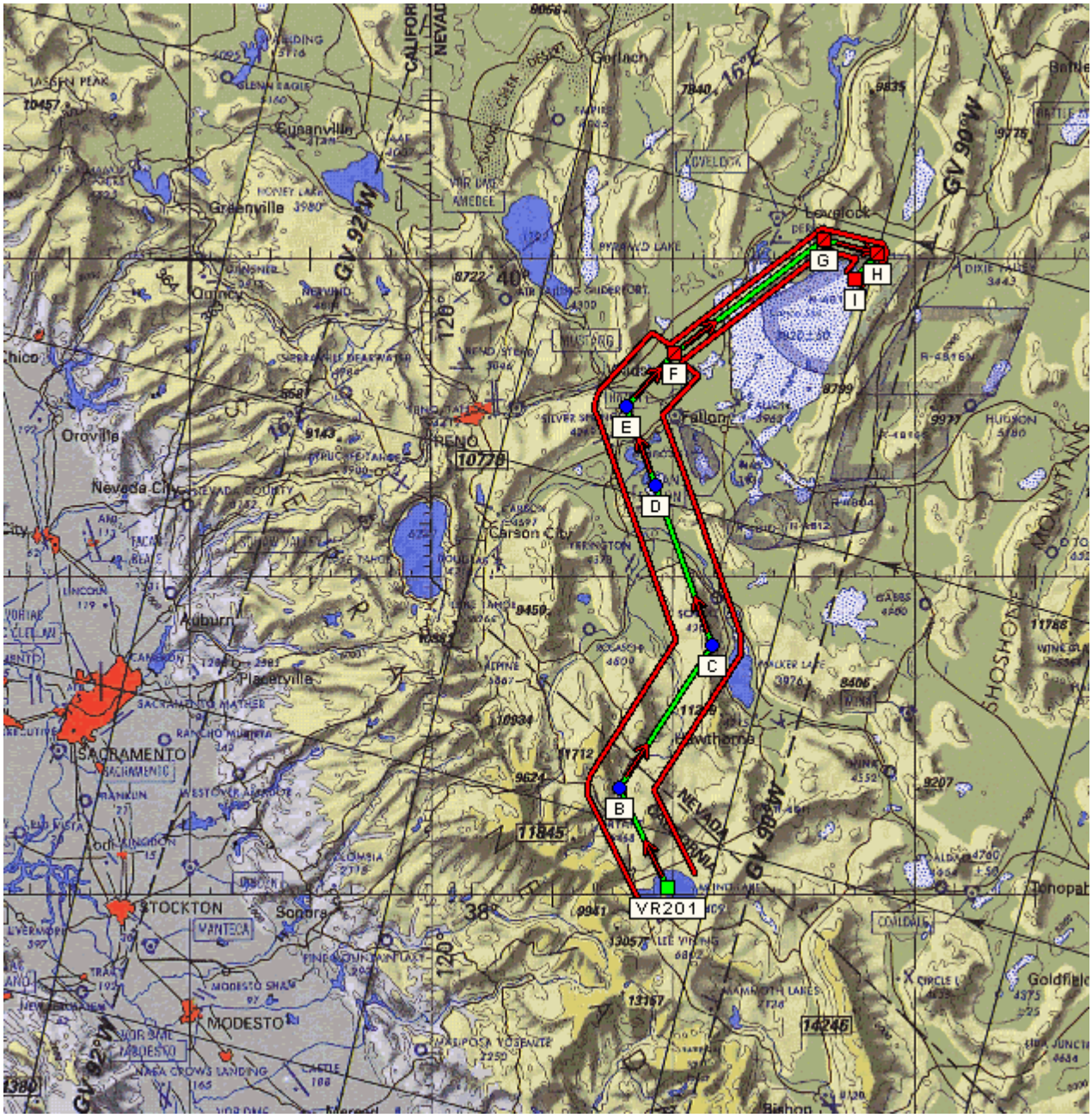


Figure B-11 VR-201

B-12 VR-208

VR208 is a six-segment, 193 mile-long route which begins east of Bishop, California and proceeds to the east into Nevada, then northward before turning to the west, terminating east of Fallon, Nevada. The route was flown 71 times in FY02. Table B-12-1 lists the route structure data and Table B-12-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-12 depicts VR208. Table B-12-3 lists the operations for the MTR in 2002.

Table B-12-1 VR-208

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA **Hours of Operation: 0800-1630 local**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		10 LT – 10 RT		N37°17.00’	W118°03.00’
B	02 AGL – 130 MSL	5 LT – 5 RT	28	N37°27.00’	W117°30.00’
C	02 AGL – 130 MSL	3 LT – 3 RT	16	N37°41.50’	W117°21.50’
D	02 AGL – 130 MSL	3 LT – 3 RT	46	N38°28.00’	W117°22.00’
E	02 AGL – 100 MSL	10 LT – 10 RT	34	N39°01.00’	W117°11.00’
F	02 AGL – 120 MSL	10 LT – 10 RT	25	N39°24.00’	W116°57.00’
G (Exit Point)	02 AGL – 120 MSL	10 LT – 10 RT	44	N39°18.00’	W117°53.00’
			193		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

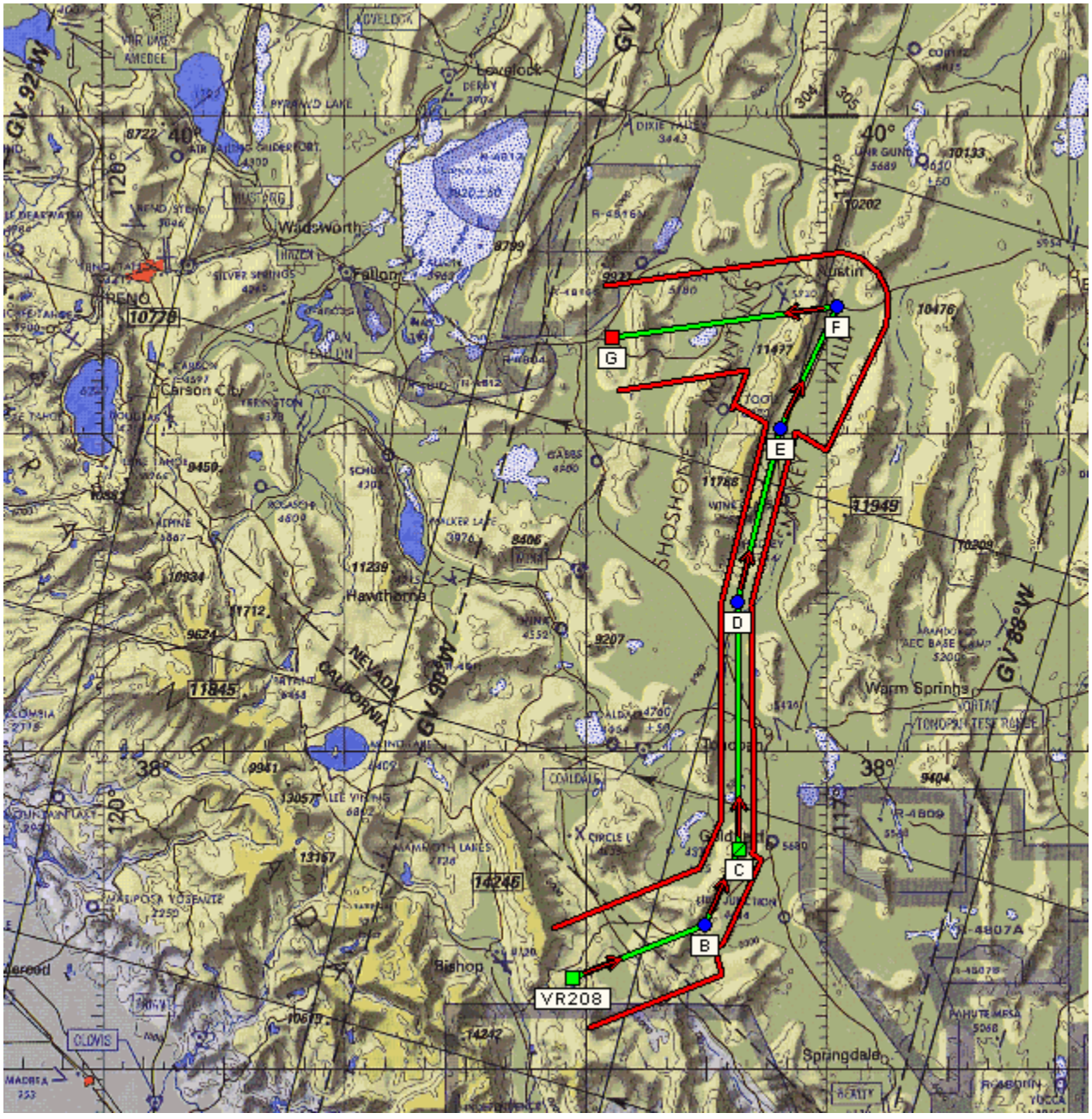
Table B-12-2 VR-208

Federal Airways	***Military Training Routes***	***Airports***
	VR-1205	None
	VR-1262	
	IR-200	
	IR-425	
	IR-286	
	VR-1252	

Table B-12-3 Annual Operations on VR-208 in 2002

Aircraft Type	**Day**	**Night**	**Total**
F/A-18	29	0	29
S-3	18	0	18
EA-6B	23	0	23
Total	71	0	71

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations.
Source: FAA 2003a.


G
F
E
D
C
B
VR208
Fallon
Carson City
Hawthorne
Bishop
Warm Springs
Goldfield
Springdale
NEVADA
CALIFORNIA
Wadsworth
Lovelock
Austin
Coaldale
Mammoth Lakes
Tonopah Test Range
Reno
Lake Tahoe
Clovis
Merced
Yosemite
Death Valley
Las Vegas
Pyramid Lake
Walker Lake
Mono Lake
Owens Lake
Dixie Valley
Shoshone Mts
Toiyabe Mts
Monte Cristo Mts
Gabbs Valley Range
Paradise Valley
Kings Canyon
Sequoia
Yosemite
Mariposa
Yosemite
Yosemite
Yosemite

B-13 VR-1250

VR1250 is a 14-segment, 358 mile-long route which begins offshore west of Eureka, California and proceeds eastward across California, terminating northeast of Fallon, Nevada. The route was flown 33 times in FY02. Table B-13-1 lists the route structure data and Table B-13-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-13 depicts VR1250. Table B-13-3 lists the operations for the MTR in 2002.

Table B-13-1 VR-1250

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA **Hours of Operation: Daylight Hours, Other Times by NOTAM**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		2 LT – 2 RT		N41°00.00’	W124°30.00’
B	02 AGL – 15 AGL	2 LT – 2 RT	22	N41°00.00’	W124°06.50’
C	02 AGL – 15 AGL	2 LT – 2 RT	23	N41°00.00’	W123°38.00’
D	02 AGL – 15 AGL	2 LT – 2 RT	14	N41°00.00’	W123°27.00’
E	02 AGL – 15 AGL	2 LT – 2 RT	31	N41°00.00’	W122°47.00’
F	02 AGL – 15 AGL	2 LT – 2 RT	22	N41°00.00’	W122°21.00’
G	02 AGL – 15 AGL	2 LT – 2 RT	13	N41°00.00’	W122°04.00’
H	02 AGL – 15 AGL	2 LT – 2 RT	30	N41°00.00’	W121°24.00’
I	02 AGL – 15 AGL	2 LT – 2 RT	61	N40°00.00’	W120°45.00’
J	02 AGL – 15 AGL	2 LT – 2 RT	24	N40°00.00’	W120°17.00’
K	02 AGL – 15 AGL	2 LT – 2 RT	42	N39°00.00’	W119°26.00’
L	02 AGL – 15 AGL	2 LT – 2 RT	23	N39°00.00’	W118°59.00’
M	02 AGL – 15 AGL	2 LT – 2 RT	36	N40°00.00’	W118°22.00’
N	02 AGL – 15 AGL	2 LT – 2 RT	10	N40°00.00’	W118°09.00’
O (Exit Point)	02 AGL – 15 AGL	2 LT – 2 RT	7	N39°00.00’	W118°14.50’
			358		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-13-2 VR-1250

Federal Airways	***Military Training Routes***	***Airports***
	VR-1251	
	VR-1261	
	SR-353	
	IR-207	
	VR-202	

Table B-13-3 Annual Operations on VR-1250 in 2002

Aircraft Type	Day	Night	Total
F/A-18	10	0	10
T-38	9	0	9
S-3	14	0	14
F-15	1	0	1
T-45	1	0	1
C-17	1	0	1
Total	33	0	33

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m. Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations. Source: FAA 2003a.



Figure B-13 VR-1250

B-14 VR-1252

VR1252 is a seven-segment, 184 mile-long route which begins northwest of Springdale, Nevada and proceeds north, terminating northeast of Fallon, Nevada. The route was flown five times in FY02. Table B-14-1 lists the route structure data and Table B-14-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-14 depicts VR1252. Table B-14-3 lists the operations for the MTR in 2002.

Table B-14-1 VR-1252

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA
Hours of Operation: Daylight Hours, Other Times by NOTAM

Route Description

Point	*Altitude Data (100 FT)*	*Route Width (NM)*	*Length (NM)*	*Latitude*	*Longitude*
A (Entry Point)		3 LT – 3 RT		N37°12.00'	W117°07.00'
B	2 AGL – 15 AGL	3 LT – 3 RT	42	N37°50.00'	W117°30.00'
C	2 AGL – 15 AGL	3 LT – 3 RT	32	N38°19.00'	W117°48.00'
D	2 AGL – 15 AGL	3 LT – 3 RT	25	N38°44.00'	W117°42.00'
E	2 AGL – 15 AGL	3 LT – 3 RT	35	N39°18.00'	W117°34.00'
F	2 AGL – 15 AGL	3 LT – 3 RT	18	N39°35.00'	W117°43.00'
G	2 AGL – 15 AGL	3 LT – 3 RT	17	N39°48.00'	W117°58.00'
H (Exit Point)	2 AGL – 15 AGL	3 LT – 3 RT	15	N39°56.00'	W118°14.50'
			184		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-14-2 VR-1252

Federal Airways	*Military Training Routes*	*Airports*
V-135	VR-1214	None
	VR-208	
	IR-281	
	IR-264	

Table B-14-3 Annual Operations on 1252 in 2002

Aircraft Type	Day	Night	Total
T-45	2	0	2
AV-8B	1	0	1
A-10	2	0	2
Total	5	0	5

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Source: FAA 2003a.

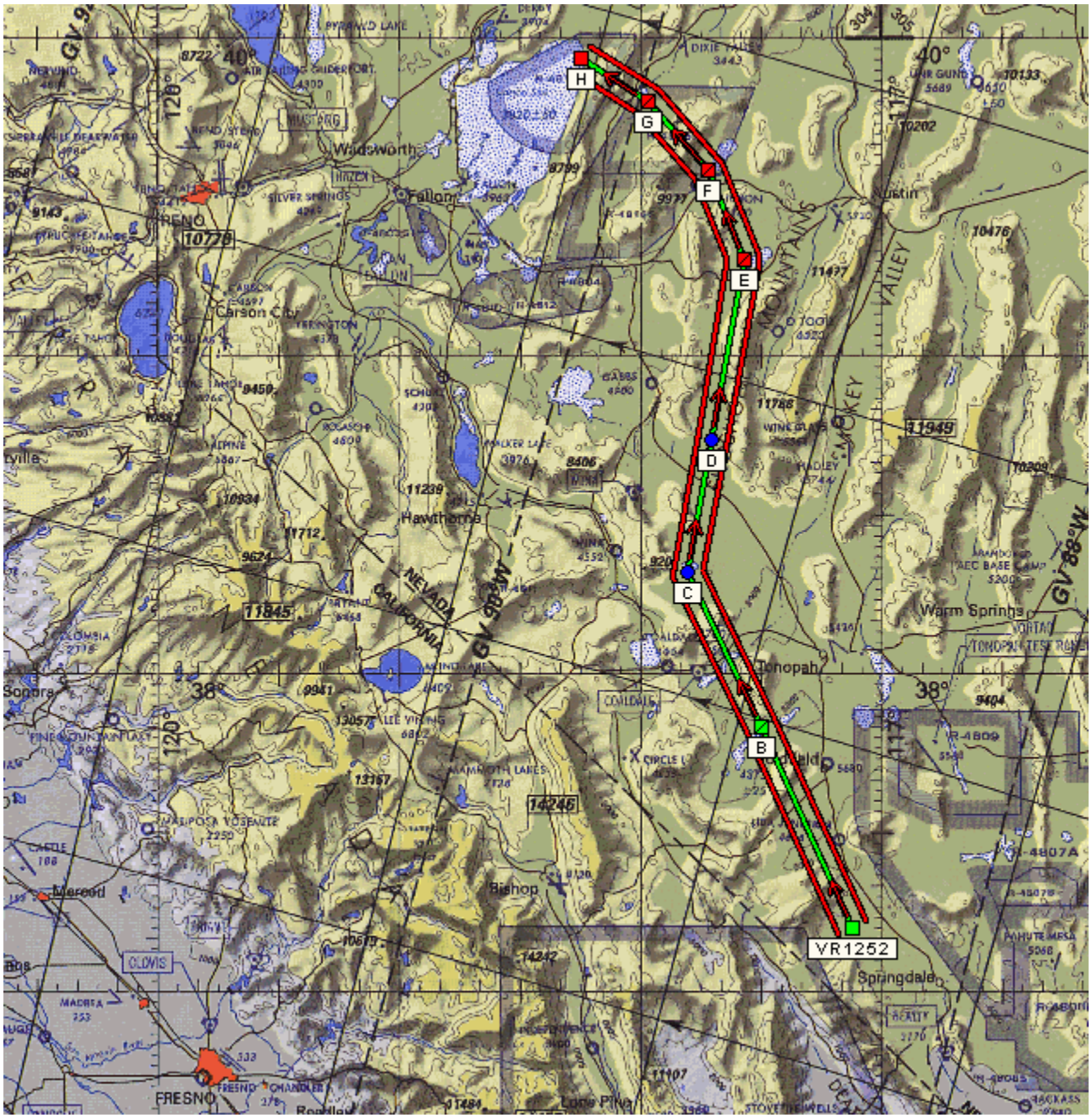


Figure B-14 VR-1252

B-15 VR-1254

VR1254 is an eight-segment, 247 mile-long route which begins northwest of Alturas, California and proceeds eastward into Nevada, then south and southeast, terminating northeast of Fallon, Nevada. The route was flown 20 times in FY02. Table B-15-1 lists the route structure data and Table B-15-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-15 depicts VR1254. Table B-15-3 lists the operations for the MTR in 2002.

Table B-15-1VR-1254

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA **Hours of Operation: Daylight Hours, Other Times by NOTAM**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		2 LT – 2 RT		N41°38.00'	W121°18.00'
B	02 AGL – 15 AGL	2 LT – 2 RT	35	N41°53.00'	W120°36.00'
C	02 AGL – 15 AGL	2 LT – 2 RT	37	N41°40.00'	W119°50.00'
D	02 AGL – 15 AGL	2 LT – 2 RT	38	N41°04.00'	W120°07.00'
E	02 AGL – 15 AGL	2 LT – 2 RT	58	N40°12.50'	W119°32.50'
F	02 AGL – 15 AGL	2 LT – 2 RT	45	N39°44300'	W118°39.50'
G	02 AGL – 15 AGL	2 LT – 2 RT	17	N40°03.50'	W118°22.00'
H	02 AGL – 15 AGL	2 LT – 2 RT	10	N40°01.00'	W118°09.00'
I (Exit Point)	02 AGL – 15 AGL	2 LT – 2 RT	7	N39°56.00'	W118°14.50'
			247		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

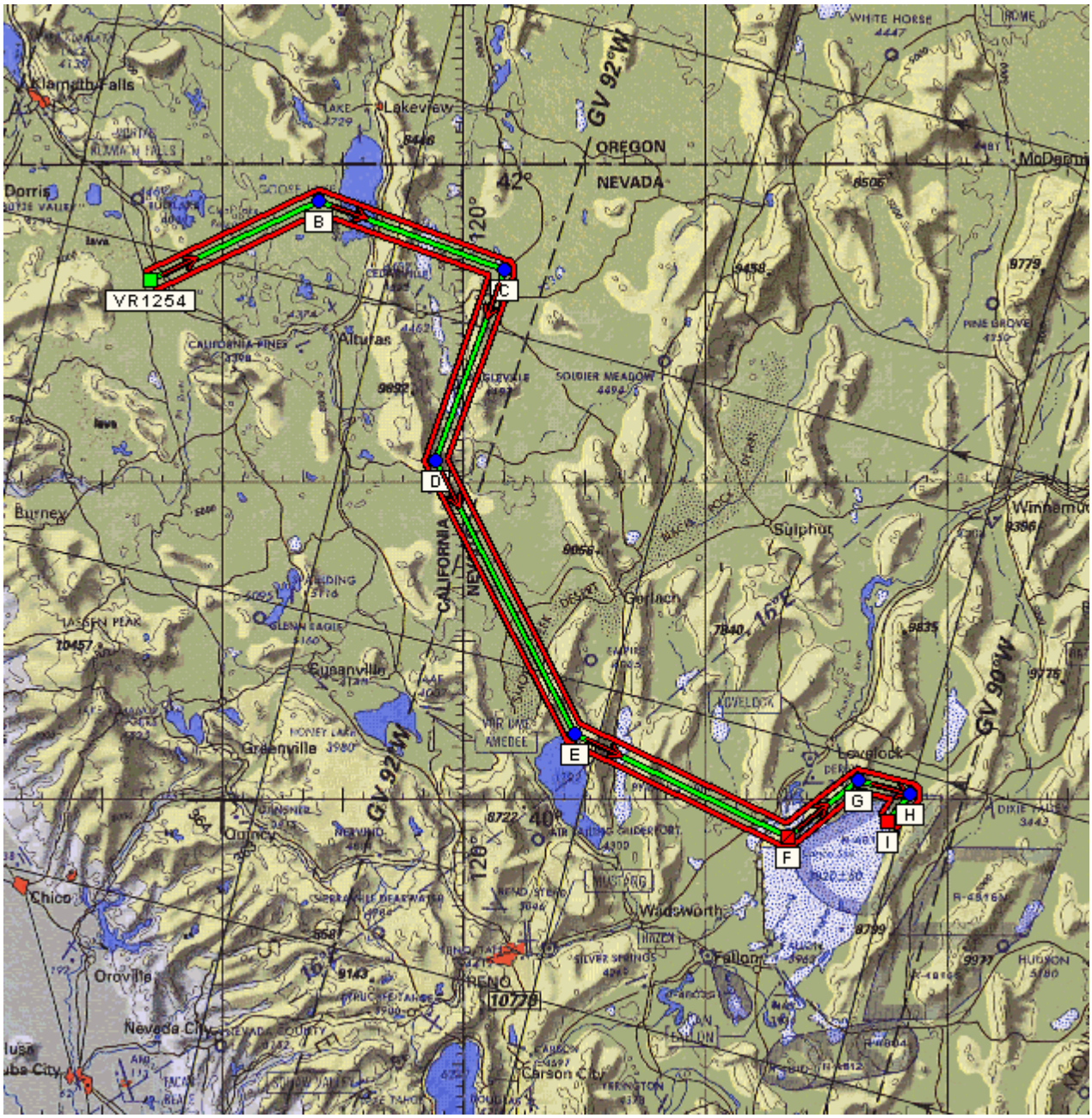
Table B-15-2 VR-1254

Federal Airways	*Military Training Routes*	*Airports*
V-6	IR-207	
	VR-1251	
	VR-1261	
	VR-203	

Table B-15-3 Annual Operations on VR-1254 in 2002

Aircraft Type	Day	Night	Total
F/A-18	6	0	6
T-38	1	0	1
S-3	6	0	6
T-45	1	0	1
EA-6B	7	0	7
Total	20	0	20

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations.
Source: FAA 2003a.


VR1254
B
C
D
E
F
G
H
I
OREGON
NEVADA
Klamath Falls
Lakeview
Alturas
Burney
Susanville
Greenville
Quincy
Chico
Oroville
Nevada City
Reno
Fallon
Wadsworth
Carson City
Lovelock
Winnemucca
Sulphur
Gerlach
Cedarville
Eagleville
Soldier Meadow
Pine Grove
Dorris
McDermitt
Amedee
Mustang
Empire
Hazen
Silver Springs
Fairon
Truckee-Tahoe
Incline
Huxton
Dixie Valley
Dixie Valley
Dixie Valley

B-16 SR-381

SR381 is an eight-segment, 142 mile-long route which begins in California south of Lake Tahoe and proceeds to the northeast into Nevada before turning to the west, terminating north of Fallon, Nevada. The route was not flown in FY02. Table B-16-1 lists the route structure data and Table B-16-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-16 depicts SR381. The route was not flown in 2002 (ANG 2003b).

Table B-16-1 SR-381

Originating/Scheduling Activity: 129th RQW/DOW, Moffett Federal Afld, CA **Hours of Operation: Continuous**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		3 LT – 3 RT		N38°39.00’	W120°09.00’
B		3 LT – 3 RT	23	N38°51.00’	W119°44.00’
C		3 LT – 6 RT	19	N38°54.00’	W119°20.00’
D		3 LT – 3 RT	24	N39°03.00’	W118°51.00’
E		3 LT – 3 RT	10	N39°13.00’	W118°50.00’
F		3 LT – 3 RT	12	N39°18.00’	W118°36.00’
G		3 LT – 3 RT	16	N39°30.00’	W118°23.00’
H		3 LT – 3 RT	8	N39°38.00’	W118°21.00’
I (Exit Point)		3 LT – 3 RT	30	N39°42.00’	W118°59.00’
			142		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-16-2 SR-3810

Federal Airways	*Military Training Routes*	*Airports*
	VR-201	Fallon Muni

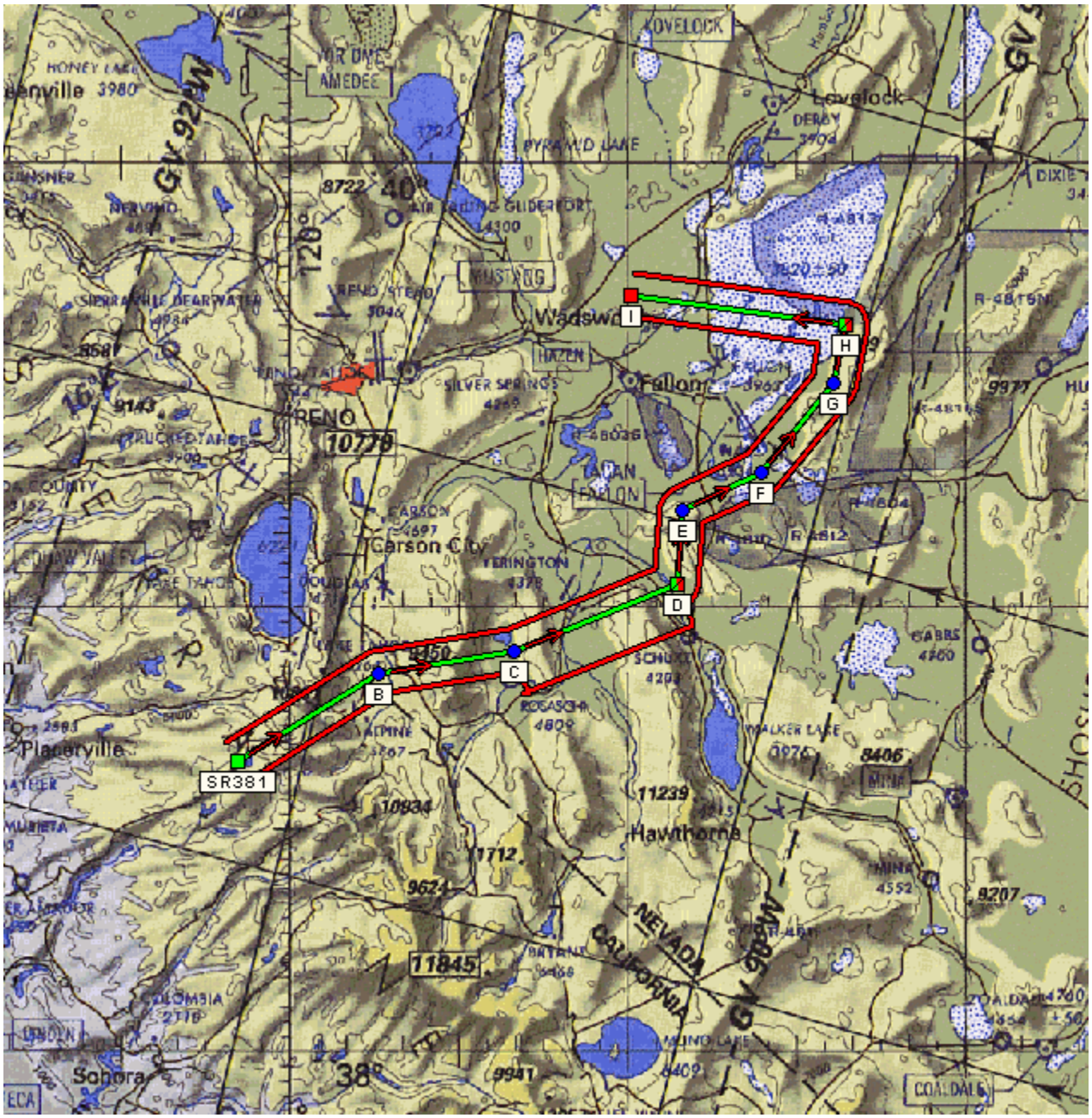


Figure B-16 SR 381

B-2 IR-207

IR207 is a 20-segment, 450 mile-long route which begins south of San Francisco, California and proceeds to the northwest, then north and eastward before terminating northeast of Fallon, Nevada. The route was flown 42 times in FY02. Table B-2-1 lists the route structure data and Table B-2-2 presents the federal airways and MTRs that intersect the route as well as the airports within the corridor. Figure B-2 depicts IR207. Table B-2-3 lists the operations for the MTR in 2002.

Table B-2-1 IR-207

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA Hours of Operation: Daylight Hours, Other Times by NOTAM					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		2.5LT – 2.5RT		N36°32.00’	W121°56.00’
B	80 MSL – 150 MSL	2.5LT – 2.5RT	25	N36°50.00’	W122°18.00’
C	30 MSL – 80 MSL	2.5LT – 2.5RT	14	N37°00.00’	W122°30.00’
D	30 MSL – 80 MSL	2.5LT – 2.5RT	22	N37°15.00’	W122°50.00’
E	30 MSL	2.5LT – 2.5RT	28	N37°42.00’	W122°59.00’
F	30 MSL	2.5LT – 2.5RT	9	N37°51.00’	W122°56.00’
G	30 MSL – 50 MSL	2.5LT – 2.5RT	15	N38°01.00’	W123°10.00’
H	50 MSL	5LT – 5RT	26	N38°27.00’	W123°07.00’
I	50 MSL – 90 MSL	5LT – 5RT	11	N38°37.00’	W123°01.00’
J	90 MSL	5LT – 5RT	28	N39°02.00’	W122°45.00’
K	90 MSL	5LT – 5RT	13	N39°09.00’	W122°31.00’
L	60 MSL – 90 MSL	5LT – 5RT	9	N39°14.00’	W122°21.00’
M	60 MSL	5LT – 5RT	47	N39°40.00’	W121°31.00’
N	05 MSL – 100 MSL	5LT – 5RT	38	N40°14.00’	W121°08.00’
O	05 MSL – 100 MSL	5LT – 5RT	25	N40°33.00’	W120°47.00’
P	05 MSL – 130 MSL	2LT – 2RT	61	N40°12.50’	W119°32.50’
PA	02 MSL – 120 MSL	2LT – 2RT	15	N40°06.00’	W119°15.00’
Q	02 MSL – 100 MSL	2LT – 2RT	30	N39°53.00’	W118°39.50’
R	02 MSL – 120 MSL	2LT – 2RT	17	N40°03.50’	W118°22.00’
S	02 MSL – 120 MSL	2LT – 2RT	10	N40°01.00’	W118°09.00’
T (Exit Point)	02 MSL – 120 MSL	2LT – 2RT	7	N39°56.00’	W118°14.50’
			450		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-2-2 IR-207

Federal Airways	***Military Training Routes***	***Airports***
V27	VR202	Moller (pvt)
V199		Gunnersfield (pvt)
V494		Richvale (pvt)
V195		
V23		
V332		
V200		
V452		

Table B-2-3 Annual Operations on IR-207 in 2002

Aircraft Type	Day	Night	Total
T-38	33	0	33
F-15	5	0	5
T-45	5	0	5
Total	42	0	42

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m. Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations. Source: FAA 2003a.

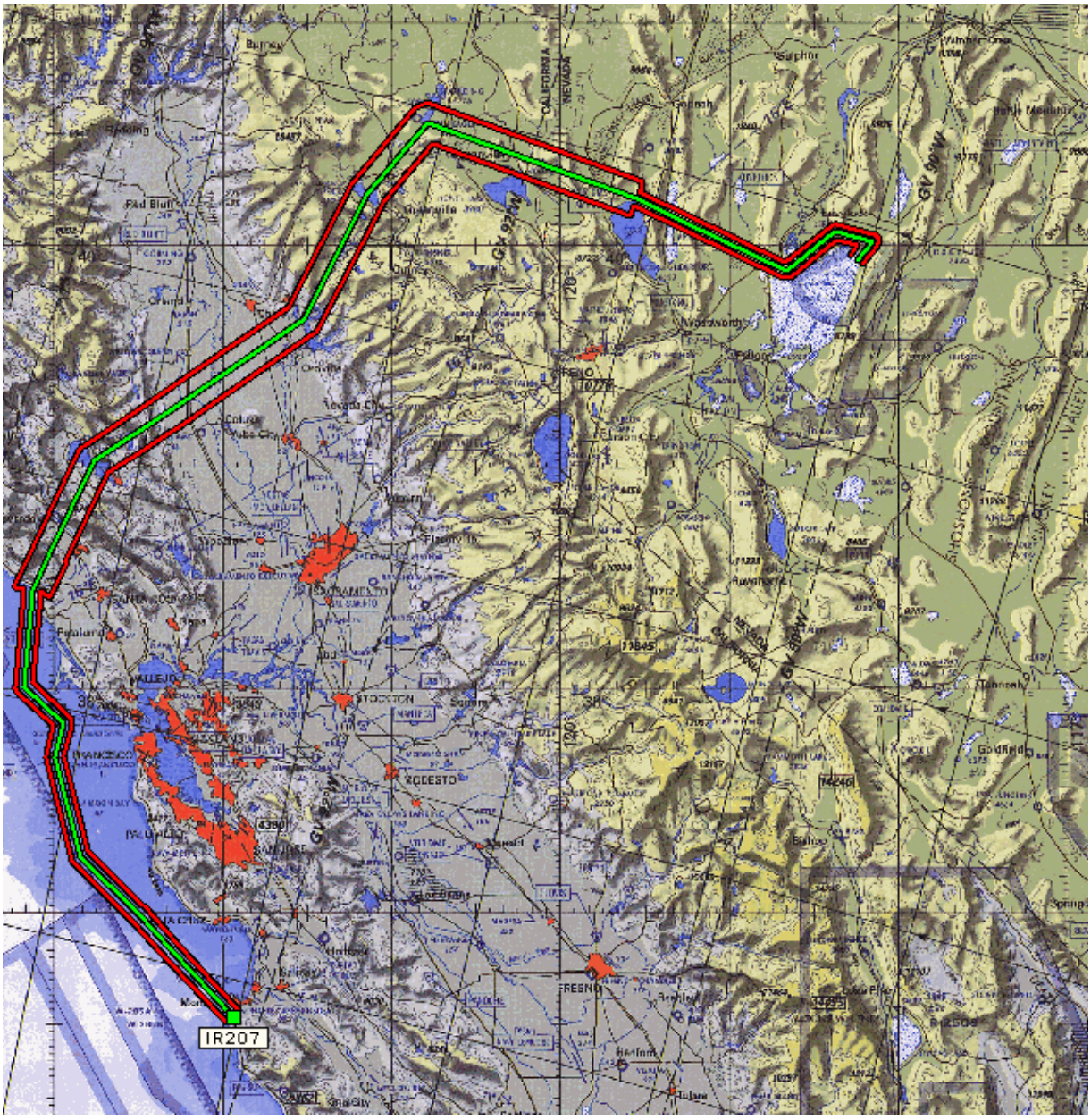


Figure B-2 IR-207

B-3 VR-202

VR202 is a 10-segment, 312 mile-long route which begins offshore in the Pacific Ocean northwest of San Francisco, California and proceeds eastward, terminating northeast of Fallon, Nevada. The route was flown 56 times in FY02. Table B-3-1 lists the route structure data and Table B-3-2 presents the federal airways and MTRs that intersect the route as well as the airports within the corridor. Figure B-3 depicts VR202. Table B-3-3 lists the operations for the MTR in 2002.

Table B-3-1 VR-202

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA Hours of Operation: Daylight Hours, Other Times by NOTAM					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		2 LT – 2 RT		N39°22.00’	W124°16.00’
B	02 AGL 15 AGL	2 LT – 2 RT	28	N39°27.00’	W123°46.00’
C	02 AGL 15 AGL	2 LT – 2 RT	14	N39°39.00’	W123°28.00’
D	05 AGL 30 AGL	2 LT – 2 RT	37	N39°47.00’	W122°41.00’
E	30 AGL 80 AGL	2 LT – 2 RT	58	N39°35.00’	W121°27.00’
F	02 AGL 30 AGL	2 LT – 2 RT	48	N39°54.00’	W120°30.00’
G	02 AGL 15 AGL	2 LT – 2 RT	44	N40°12.50’	W119°38.30’
H	02 AGL 15 AGL	2 LT – 2 RT	49	N39°53.00’	W118°39.50’
I	02 AGL 15 AGL	2 LT – 2 RT	17	N40°03.50’	W118°22.00’
J	02 AGL 15 AGL	2 LT – 2 RT	10	N40°01.00’	W118°09.00’
K (Exit Point)	02 AGL 15 AGL	2 LT – 2 RT	7	N39°56.00’	W118°14.50’
			312		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-3-2 VR-202

Federal Airways	***Military Training Routes***	***Airports***
V-27	IR-207	Haigh
V-25	VR-1250	
V-199	VR-1251	
V-87	VR-1254	
V-23		
V-195		
V-332		
V-452		
V-185		

Table B-3-3 Annual Operations on VR-202 in 2002

Aircraft Type	Day	Night	Total
F/A-18	17	0	17
T-38	12	0	12
S-3	5	0	5
EA-6B	17	0	17
AV-8B	4	0	4
Total	56	0	56

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m. Note: The sum of individual aircraft operations does not equal the total operations. Data were provided by total operations for the route and percent of total use by aircraft type. Operations were rounded to the nearest whole number when determining specific aircraft operations. Source: FAA 2003a.



Figure B-3 VR-202

B-4 VR-249

VR249 is a five-segment, 100 mile-long route beginning northwest of King City, California and which proceeds to the southeast along the California coastline, terminating northwest of Vandenberg AFB. The route was flown 84 times in FY02. Table B-4-1 lists the route structure data and Table B-4-2 presents the federal airways and MTRs that intersect the route as well as the airports within the corridor. Figure B-4 depicts VR249. Table B-4-3 lists the operations for the MTR in 2002.

Table B-4-1 VR-249

Originating/Scheduling Activity: 3rd Marine Aircraft Wing, San Diego, CA **Hours of Operation: Continuous**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		5 LT – 5 RT		N36°18.00'	W121°55.00'
B	30 MSL – 50 MSL	5 LT – 5 RT	16	N36°10.00'	W121°38.00'
C	30 MSL – 50 MSL	5 LT – 5 RT	34	N35°39.00'	W121°20.00'
D	30 MSL – 50 MSL	5 LT – 5 RT	20	N35°26.00'	W121°01.00'
E	30 MSL – 50 MSL	5 LT – 5 RT	11	N35°15.00'	W120°57.00'
F (Exit Point)	30 MSL – 50 MSL	5 LT – 5 RT	19	N35°02.00'	W120°40.00'
			100		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-4-2 VR-249

Federal Airways	*Military Training Routes*	*Airports*
V-27	None	None

Table B-4-3 Annual Operations on VR-249 in 2002

Aircraft Type	Day	Night	Total
F/A-18	62	0	62
C-130	3	0	3
T-45	1	0	1
F-15	14	0	14
F-16	2	0	2
S-3	1	0	1
EA-6B	1	0	1
Total	84	0	84

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Source: 2 MAW 2003.

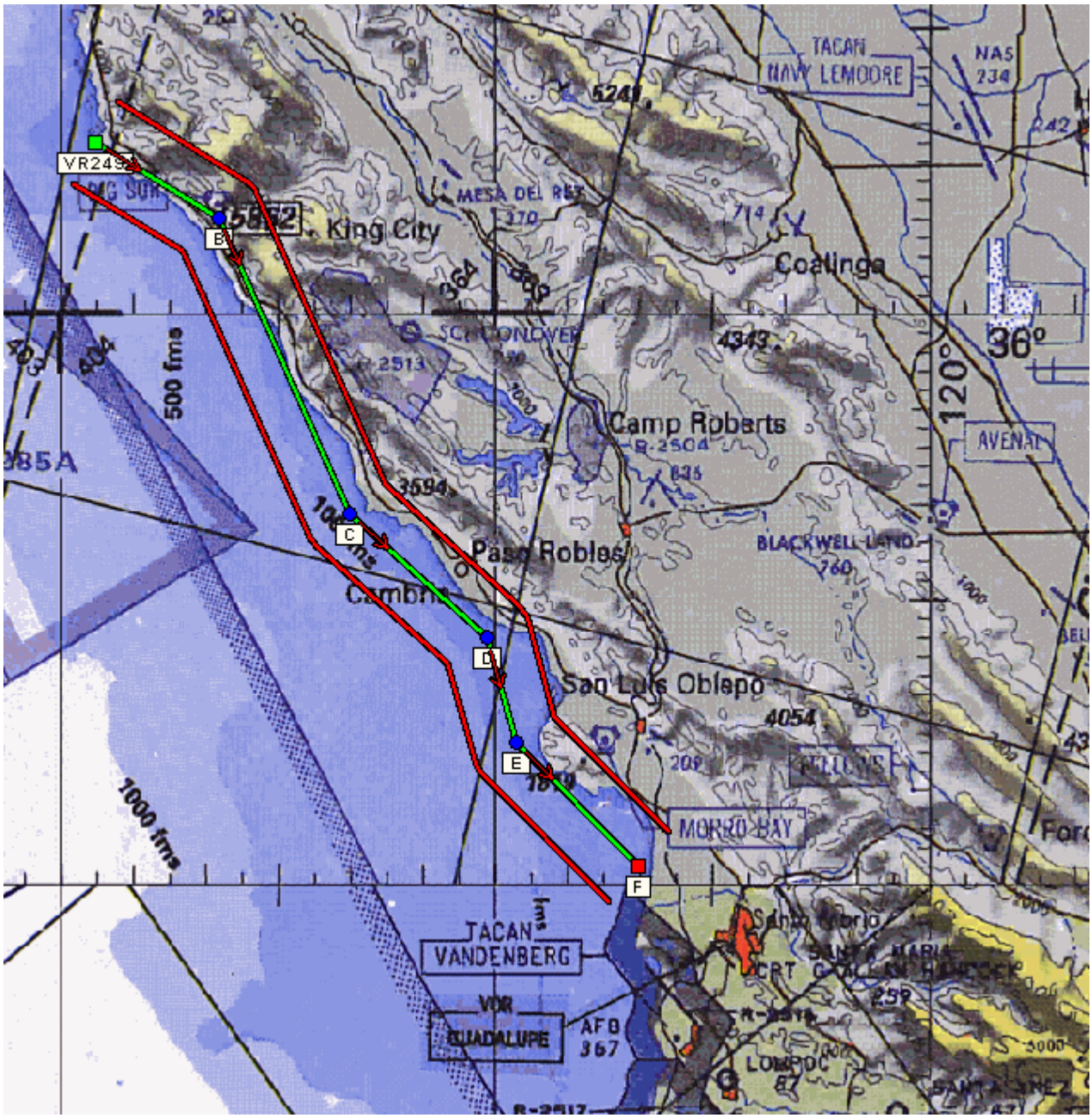


Figure B-4 VR-249

B-5 VR-1205

VR1205 is a seven-segment, 194 mile-long route which begins northwest of Goldfield, Nevada and proceeds southward, terminating east of Palmdale, California. The route was flown 68 times in FY02. Table B-5-1 lists the route structure data and Table B-5-2 presents the federal airways and MTRs that intersect the route as well as the airports within the corridor. Figure B-5 depicts VR-1205. Table B-5-3 lists the operations for the MTR in 2002.

Table B-5-1 VR-1205

Originating/Scheduling Activity: AFFTC, Edwards AFB, CA
Hours of Operation: Continuous

Route Description

Point	Altitude Data (100 FT)	Route Width (NM)	Length (NM)	Latitude	Longitude
A (Entry Point)		2 LT – 2 RT		N37°55.00'	W117°57.00'
B	02 AGL – 15 AGL	2 LT – 2 RT	76	N36°40.00'	W117°41.00'
C	02 AGL – 15 AGL	2 LT – 2 RT	30	N36°15.00'	W117°21.00'
D	02 AGL – 15 AGL	2 LT – 2 RT	14	N36°04.00'	W117°11.00'
E	02 AGL – 15 AGL	2 LT – 2 RT	21	N35°44.00'	W117°05.00'
F	02 AGL – 15 AGL	2 LT – 2 RT	30	N35°14.00'	W117°05.00'
G	02 AGL – 15 AGL	2 LT – 2 RT	20	N34°56.00'	W117°16.00'
H (Exit Point)	02 AGL – 15 AGL	2 LT – 2 RT	3	N34°53.00'	W117°16.00'
			194		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-5-2 VR-1205

Federal Airways	*Military Training Routes*	*Airports*
	IR-236	
	VR-1255	
	VR-1262	
	VR-208	

Table B-5-3 Annual Operations on VR-1205 in 2002

Aircraft Type	Day	Night	Total
B-1	60	0	60
C-12	2	0	2
F-15	1	0	1
F-16	5	0	5
Total	68	0	68

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Source: FAA 2003b.

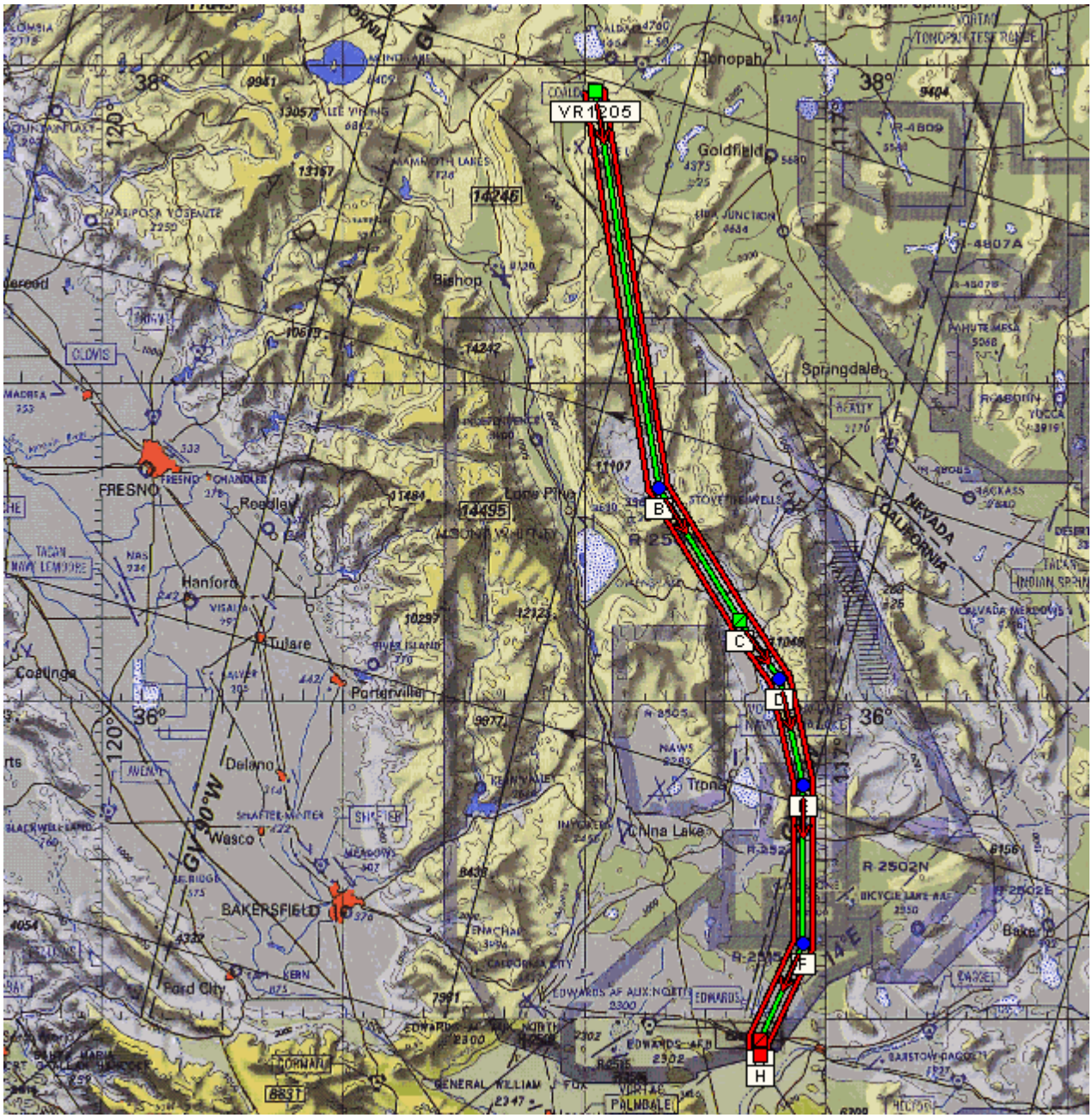


Figure B-5 VR-1205

B-6 VR-1215

VR1215 is a six-segment, 117 mile-long route which begins north of San Bernardino, California and proceeds northward and then westward, terminating near Ridgecrest, California. The route was flown two times in FY02. Table B-6-1 lists the route structure data and Table B-6-2 presents the federal airways and MTRs that intersect the route as well as the airports within the corridor. Figure B-6 depicts VR1215. Table B-6-3 lists the operations for the MTR in 2002.

Table B-6-1 VR-1215

Originating/Scheduling Activity: AFFTC, Edwards AFB, CA
Hours of Operation: Sunrise-Sunset, Daily

Route Description

Point	Altitude Data (100 FT)	Route Width (NM)	Length (NM)	Latitude	Longitude
A (Entry Point)		5 LT – 5 RT		N34°27.00'	W117°00.00'
B	15 AGL	5 LT – 5 RT	6	N34°32.00'	W116°55.00'
C	05 AGL – 15 AGL	5 LT – 5 RT	26	N34°51.00'	W116°34.00'
D	01 AGL – 15 AGL	5 LT – 5 RT	37	N35°22.00'	W116°09.00'
E	01 AGL – 15 AGL	5 LT – 5 RT	17	N35°38.00'	W116°17.00'
F	01 AGL – 15 AGL	5 LT – 5 RT	20	N35°44.00'	W116°41.00'
G (Exit Point)	01 AGL – 15 AGL	5 LT – 5 RT	11	N35°43.00'	W116°55.00'
			117		

LT=NM distance left of route center line; RT=NM distance right of route center line
Source: DoD 2002

Table B-6-2 VR-1215

Federal Airways	*Military Training Routes*	*Airports*
V-386	VR-1217	None
V-442	VR-1265	
V-12	VR-1218	
V-394	IR-212	

Table B-6-3 Annual Operations on VR-1215 in 2002

Aircraft Type	Day	Night	Total
C-12	1	0	1
F-18	1	0	1
Total	2	0	2

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
Source: FAA 2003b.

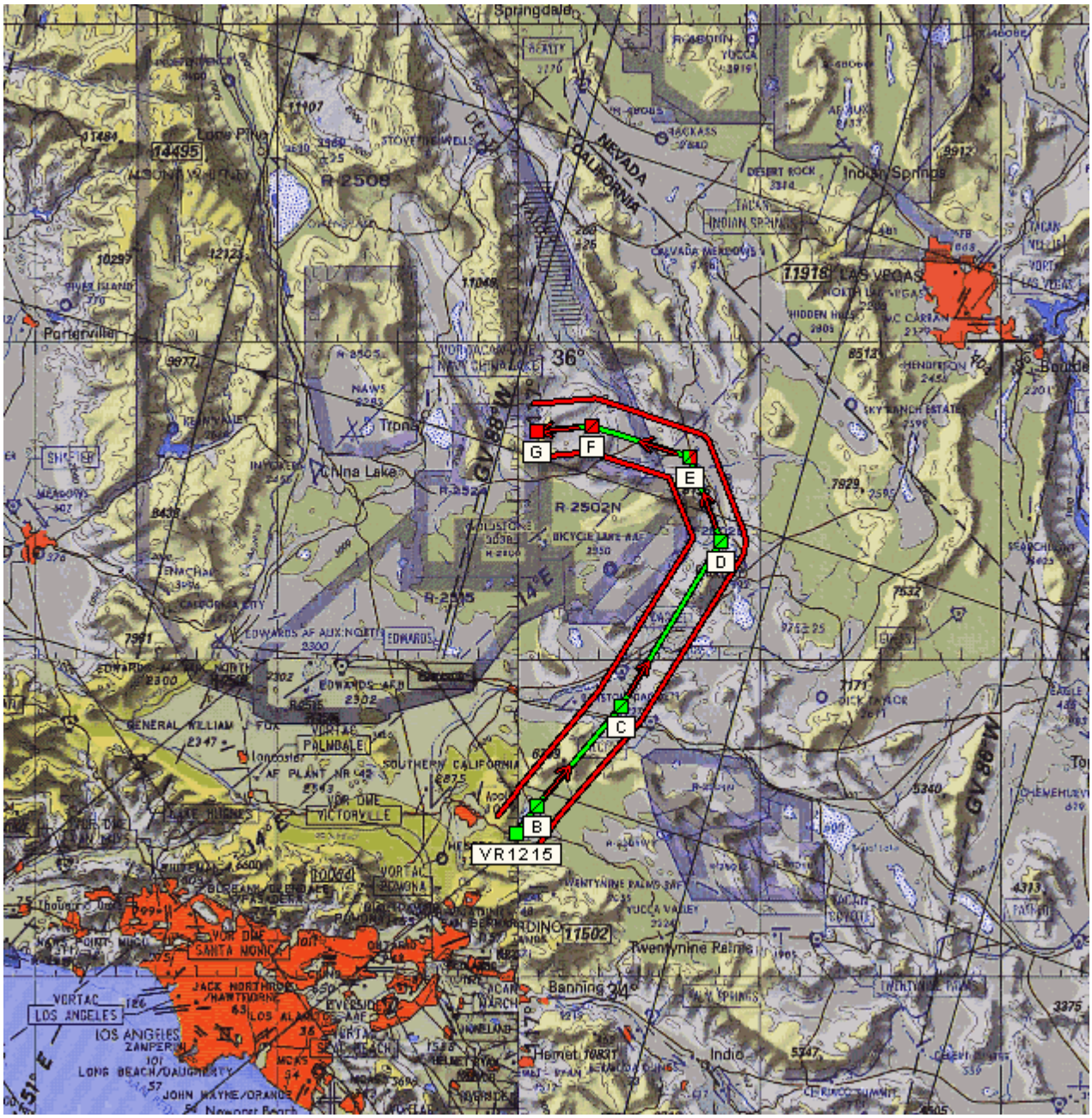


Figure B-6 VR-1215

B-7 SR-300/301

SR300 is a 20-segment, 760 mile-long route which begins southeast of Sacramento, California and proceeds counterclockwise, terminating northwest of Sacramento. SR301 has the same route points; however, the route is flown clockwise. The routes were flown a combined 264 times in FY02. Table B-7-1 lists the route structure data, and Table B-7-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-7 depicts SR300/301. Table B-7-3 lists the operations for the MTRs in 2002.

Table B-7-1 SR-300/301

Originating/Scheduling Activity: **129th RQW/DOW, Moffett Federal Afld, CA** **Hours of Operation: Continuous**					
Route Description					
Point	***Altitude Data (100 FT)***	***Route Width (NM)***	***Length (NM)***	***Latitude***	***Longitude***
A (Entry Point)		5 LT – 5 RT		N38°04.30’	W121°00.20’
B		5 LT – 5 RT	45	N38°32.00’	W120°15.00’
C		5 LT – 5 RT	31	N38°51.00’	W119°44.00’
D		5 LT – 5 RT	45	N38°51.00’	W118°46.70’
E		5 LT – 5 RT	35	N38°44.60’	W118°02.60’
F		5 LT – 5 RT	52	N39°24.00’	W117°18.20’
G		5 LT – 5 RT	37	N40°01.00’	W117°11.5’
H		5 LT – 5 RT	36	N40°36.83’	W117°20.00’
I		5 LT – 5 RT	29	N40°26.67’	W117°56.12’
J		5 LT – 5 RT	42	N40°55.00’	W118°37.00’
K		5 LT – 5 RT	25	N41°19.00’	W118°48.00’
L		5 LT – 5 RT	62	N42°12.00’	W119°32.00’
M		5 LT – 5 RT	37	N42°31.00’	W120°15.00’
N		5 LT – 5 RT	51	N41°50.30’	W120°57.00’
O		5 LT – 5 RT	36	N41°16.80’	W121°13.80’
P		5 LT – 5 RT	37	N41°02.00’	W121°59.20’
Q		5 LT – 5 RT	18	N41°01.00’	W122°23.00’
R		5 LT – 5 RT	40	N40°29.80’	W122°56.90’
S		5 LT – 5 RT	41	N39°53.20’	W122°32.60’
T		5 LT – 5 RT	35	N39°18.20’	W122°29.50’
U (Exit Point)		5 LT – 5 RT	26	N39°04.10’	W122°01.50’
			760		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-7-2 SR-300/301

Federal Airways	***Military Training Routes***	***Airports***
None	VR-201	None
	VR-126	
	VR-1253	
	VR-1352	
	IR-300	
	VR-1251	
	VR-1261	
	VR-202	
	VR-1250	
	IR-207	

Table B-7-3 Annual Operations on SR300/301 in 2002

Aircraft Type	Day	Night	Total
C-130	198	66	264

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m.
SourceANG 2003a.

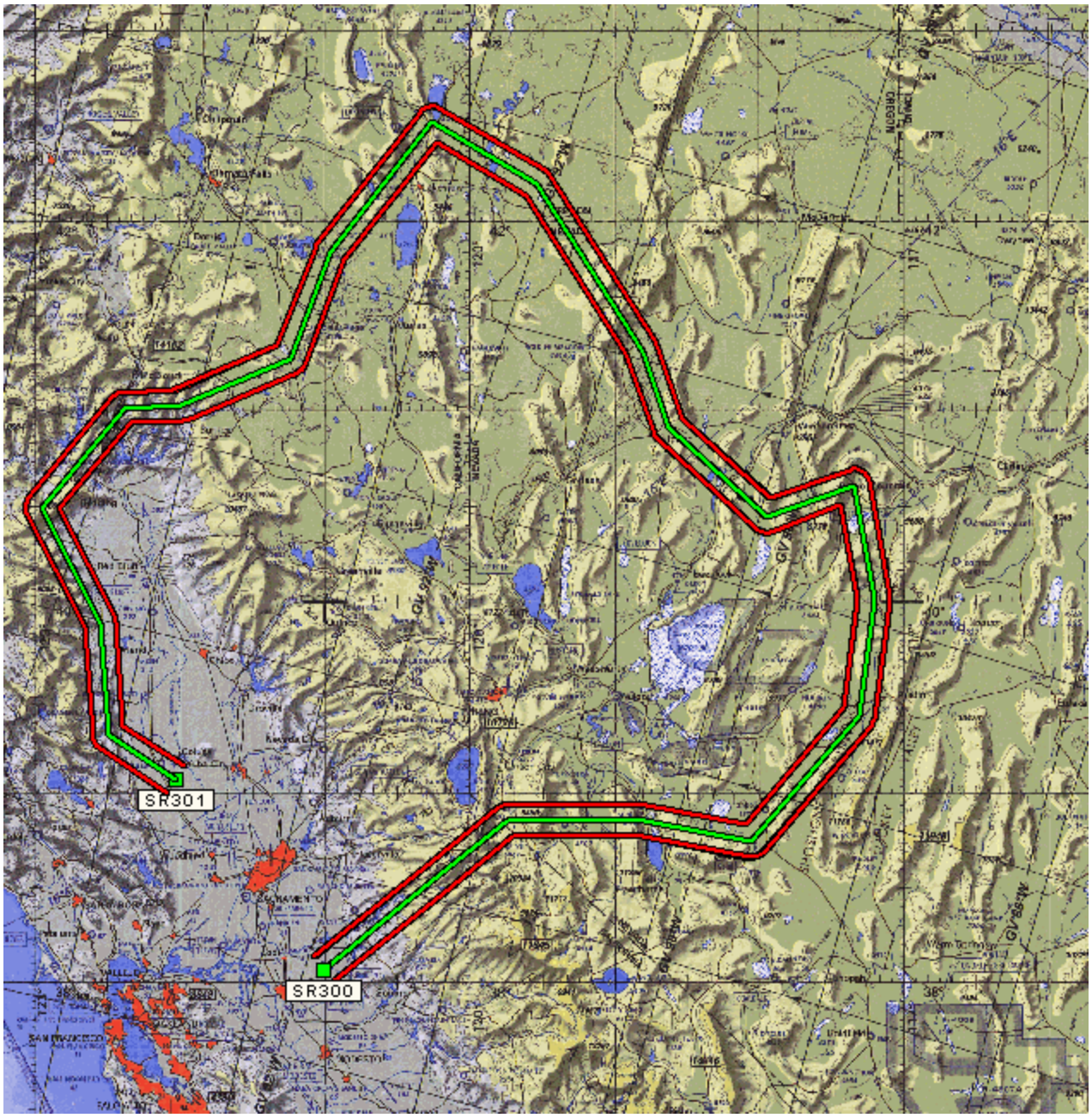


Figure B-7 SR-300/301

B-8 SR-311/359

SR311 is an eight-segment, 145 mile-long route which begins southeast of Sacramento, California and proceeds eastward, then to the northwest, and then turns northward, terminating northwest of Reno, Nevada. SR359 has the same route points; however, the route is flown in the opposite direction. Table B-8-1 lists the route structure data, and Table B-8-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-8 depicts SR311/359. The route was not flown in 2002 (ANG 2003b).

Table B-8-1 SR-311/359

Originating/Scheduling Activity: 129th RQW/DOW, Moffett Federal Afld, CA **Hours of Operation: Continuous**					
Route Description					
Point	**Altitude Data (100 FT)**	**Route Width (NM)**	**Length (NM)**	**Latitude**	**Longitude**
A (Entry Point)		3 LT – 3 RT		N39°45.50’	W120°05.00’
B		3 LT – 3 RT	10	N39°36.00’	W120°06.00’
C		3 LT – 3 RT	16	N39°29.00’	W120°25.00’
D		3 LT – 3 RT	23	N39°06.50’	W120°28.00’
E		3 LT – 3 RT	14	N38°54.00’	W120°36.00’
F		3 LT – 3 RT	27	N38°39.00’	W120°07.00’
G		3 LT – 3 RT	9	N38°32.00’	W120°15.00’
H		3 LT – 3 RT	22	N38°33.50’	W120°43.00’
I (Exit Point)		3 LT – 3 RT	24	N38°25.00’	W121°12.00’
			145		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-8-2 SR-311

Federal Airways	*Military Training Routes*	*Airports*

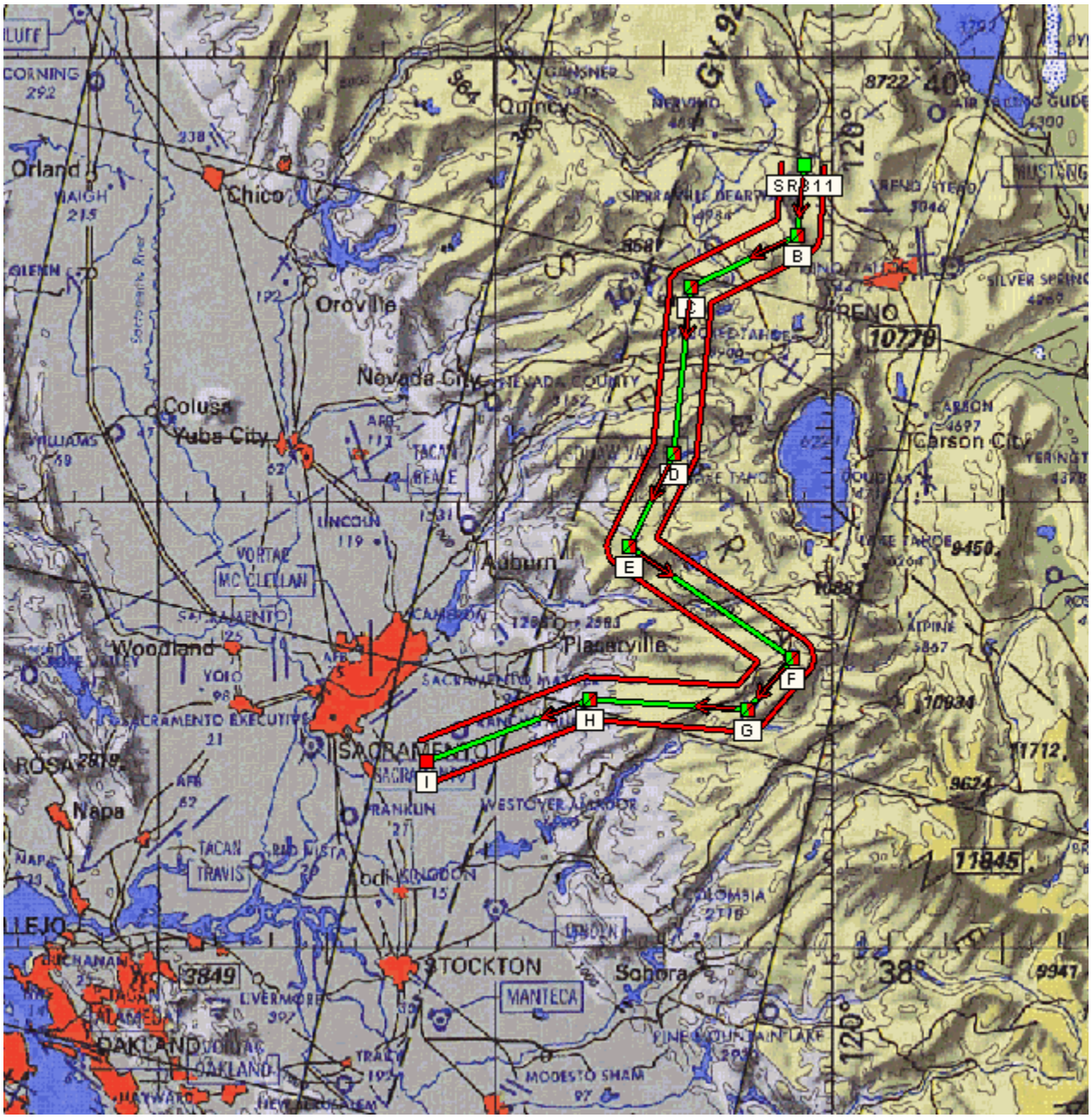


Figure B-8 SR-311/359

B-1 IR-203

IR203 is a seven-segment, 411 mile-long route which begins northwest of Bakersfield, California and proceeds to the southwest, then northward before turning to the southeast, terminating northeast of Tulare, California. The route was flown six times in FY02. Table B-1-1 lists the route structure data and Table B-1-2 presents the federal airways and MTRs that intersect the route, as well as the airports within the corridor. Figure B-1 depicts IR203. Table B-1-3 lists the operations for the MTR in 2002.

Table B-1-1 IR-203

Originating/Scheduling Activity: Strike Fighter Wing, NAS Lemoore, CA **Hours of Operation: Daylight Hours Other Times by NOTAM**					
Route Description					
Point	***Altitude Data (100 FT)***	***Route Width (NM)***	***Length (NM)***	***Latitude***	***Longitude***
A (Entry Point)		6LT - 6RT		N35°39.00'	W119°58.00'
B	70 MSL – 100 MSL	6LT - 6RT	48	N35°23.00'	W120°54.00'
C	80 MSL – 100 MSL	6LT - 6RT	51	N36°13.00'	W121°08.00'
D	70 MSL – 100 MSL	6LT - 6RT	53	N36°50.00'	W121°55.00'
E	110 MSL – 120 MSL	6LT - 6RT	41	N37°03.00'	W121°07.00'
F	110 MSL – 120 MSL	6LT - 6RT	74	N38°16.00'	W120°53.00'
G	110 MSL – 120 MSL	6LT - 6RT	95	N37°00.00'	W119°42.00'
H (Exit Point)	110 MSL – 120 MSL	6LT - 6RT	49	N36°25.00'	W119°00.00'
			411		
LT=NM distance left of route center line; RT=NM distance right of route center line Source: DoD 2002					

Table B-1-2 IR-203

Federal Airways	*Military Training Routes*	*Airports*
V-485	VR1256	Blech (pvt)
V-25	VR1262	Mesa del Rey (K)
V-113	VR1257	Clark (pvt)
V-87		Howard (pvt)
V-107		Kistler (pvt)
V-301		Kindsvater (pvt)
V-111		Harris River (pvt)
V-244		Ketscher (pvt)
V-459		
V-230		
V-28		

Table B-1-3 Annual Operations on IR-203 in 2002

Aircraft Type	Day	Night	Total
F/A-18	6	0	6

Day=7:00 a.m. through 10:00 p.m. Night=10:00 p.m. through 7:00 a.m. Source: FAA 2003a.

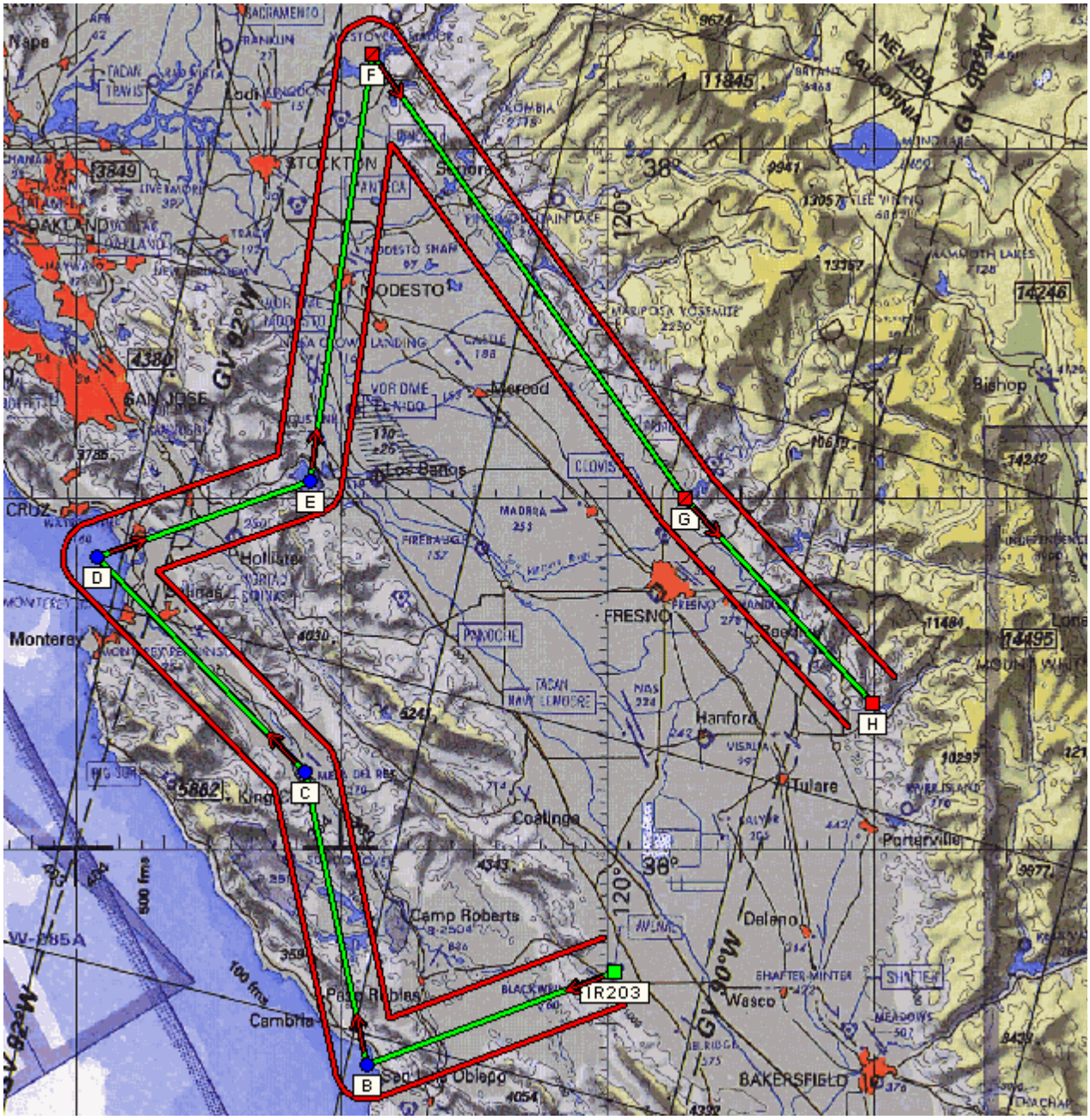


Figure B-1 IR-203

APPENDIX C
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

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PARSONS

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099 • www.parsons.com

April 24, 2003

Re: Draft Environmental Assessment, West Coast Basing of C-17 Aircraft,
Travis Air Force Base, California and McChord Air Force Base, Washington

To Whom It May Concern:

The U.S. Air Force, with Parsons assistance, has prepared an Environmental Assessment (EA) to assess the potential environmental impacts of a proposed action at either Travis Air Force Base (AFB), California (Proposed Action) or McChord AFB, Washington (Alternative Action). The action includes basing 12 C-17 aircraft and associated personnel at one of the two bases, as well as constructing facilities at the selected installation. C-17 aircrews would use 18 military training routes (MTRs) in California, Nevada, and Oregon if Travis AFB is selected as the basing location. Nine MTRs in Washington and Idaho would be used if McChord AFB is selected. The EA provides details of the action, explains the purpose and need for the action, and assesses the potential impacts of the Proposed Action and Alternative Action.

According to the National Environmental Policy Act, the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other federal, state, and local agencies on the Draft EA, which is attached along with a Draft Finding of No Significant Impact and Draft Finding of Practicable Alternative. Please identify any resources within your agency's purview that may be potentially impacted.

Privacy Advisory: Your comments on this Draft EA are requested. Letters or other written comments provided may be published in the Final EA. Comments will normally be addressed in the Final EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the Final EA.

Please provide any comments or information by May 27, 2003. Responses should be sent to: HQ AMC/CEVP, 507 Symington Drive, Scott AFB, IL 62225.

If members of your staff have any questions, the Air Force point of contact is Lt Col John Keoshian, HQ AMC/CEVP, (618) 229-0841, e mail: john.keoshian@scott.af.mil.

Sincerely,

John Wallin
Delivery Order Manager

Attachments: 1. Distribution List
2. Draft Environmental Assessment

TRAVIS AFB DISTRIBUTION LIST

AGENCIES

Federal Agencies

U.S. Department of the Interior
Fish and Wildlife Service
Federal Building
2800 Cottage, Room W-2605
Sacramento, CA 95825-1846

Mr. Michael Aceituno
National Marine Fisheries Service
6500 Capital Mall, Suite 8-300
Sacramento, CA 95814

U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

U.S. Bureau of Land Management
California State Office
2800 Cottage Way, Suite W-1834
Sacramento, CA 95825-1886

Bureau of Land Management
Nevada State Office
1340 Financial Blvd.
Reno, NV 89502

Commander Naval Air Warfare Center
Weapons Division, Code P529800E
Pt. Mugu, CA 93042

Commander Strike Fighter Wing,
US Pacific Fleet,
001 (K) Street, Room 121
NAS Lemoore, CA 93246

Commanding General
3d Marine Aircraft Wing (G-3)
MCAS Miramar
San Diego, CA 92145

Commander AFFTC
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Alameda, CA 94501

Lt Col Jim Robilotta
FAA AWP-910
1500 Aviation Blvd.
Hawthorne, CA 90250

U. S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922

State Agencies

Ms. Christine Asiata
Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, CA 95814

Nevada State Clearinghouse
Dept of Admin., Budget and Plng Div.
Blasdel Building, Room 200
209 E. Musser St
Carson City, NV 89701

Dr. Knox Mellon
State Historic Preservation Officer
Department of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296-0001

State Historic Preservation Officer
Nevada Department of Cultural Affairs
100 N. Stewart St.
Carson City, NE 89701-4285

Supervisor
California Department of Fish and Game
P.O. Box 944209
Sacramento, CA 94299-2090

Paul J. Liebendorfer, P.E.
Dept of Conservation and Natural Resources
Division of Environmental Protection
333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

Regional and Local Agencies

Yolo-Solano AQMD
1947 Galileo Ct., Ste. 103
Davis, CA 95616-4882

Bay Area AQMD
939 Ellis Street
San Francisco, CA 94109-7799

Ms. Eve Sumjen, Asst. Dir.
City of Fairfield
Department of Planning and Development
1000 Webster St.
Fairfield, CA 94533

City of Vacaville
Community Development Department
650 Merchant St.
Vacaville, CA 95688

Mr. Barry Munowitch, Director
City of Suisun City
Community Development Department
701 Civic Center Blvd.
Suisun, CA 94588

Sacramento Area Council of Governments
3000 S Street, Suite 300
Sacramento, CA 95816-7068

County Board of Supervisors

Supervisor Duane Kromm, District 3
Solano County Board of Supervisors
580 Texas Street
Fairfield, CA 94533

Supervisor John M. Vasquez, District 4
Solano County Board of Supervisors
580 Texas Street
Fairfield, CA 94533

Mayors

Mayor Karin MacMillan
Fairfield City Hall
1000 Webster St.
Fairfield, CA 94533

Mayor Len Augustine
City of Vacaville
650 Merchant St.
Vacaville, CA 95688

Mayor Jim Spering
City of Suisun City
701 Civic Center Blvd.
Suisun, CA 94588

LIBRARIES

Vacaville Public Library
1020 Ulatis Dr.
Vacaville, CA 95687

Fairfield-Suisun Community Library
1150 Kentucky Ave.
Fairfield, CA 94533

Suisun City Library
333 Sunset Ave.
Suisun City, CA 94585

Mitchell Memorial Library
510 Travis Ave. (Bldg 436)
Travis AFB, CA 94535

MCCHORD AFB DISTRIBUTION LIST

AGENCIES

Federal Agencies

Mr. Dennis Ossenkop
Federal Aviation Administration
Northwest Mountain Region
1601 Lind Ave., S.W.
Renton, WA 98055-4058

U.S. Fish and Wildlife Service
North Pacific Coast Ecoregion
Western Washington Office
510 Desmond Drive SE, Suite 102
Lacey, WA 98503

U.S. Bureau of Land Management
Washington/Oregon Office
PO Box 2965
Portland, OR 97208

U.S. Bureau of Land Management
Idaho State Office
1387 S. Vinnell Way
Boise, Idaho 83709

Ms. Ruth Siguenza
Environmental Protection Agency Region X
1200 Sixth Ave. ECO-088
Seattle, WA 98101-3188

Chief, Environmental Programs Division
Headquarters Air Mobility Command
HQ AMC/CEV
507 A Street
Scott AFB, IL 62225-5022

State Agencies

Mr. Marvin Vialle
State of Washington Environmental Review
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Mr. Bill Berrigan
Washington Department of Natural Resources
P.O. Box 190
Colville, WA 99114-0190

Dr. Jeffrey P. Koenings, Director
Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091

Dr. Allyson Brooks
State Historic Preservation Officer
Office of Archeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Ms. Suzi Neitzel, Deputy SHPO
Idaho State Historical Society
1109 Main Street. Suite 250
Boise, ID 83702

Mr. Steve Allred, Director
Idaho Dept of Environmental Quality
1410 N. Hilto
Boise, ID 83706

Regional and Local Agencies

Mr. Sean Gaffney, Senior Planner
Pierce County Planning and Land Services
2401 S. 34th Street
Tacoma, WA 98409

Mr. David Senne, Executive Manager
Port of Moses Lake
7810 Andrews St., N.E., Suite 200
Moses Lake, WA 98837-3204

Mr. David Bugler
Community Development Director
City of Lakewood
10510 Gravelly Lake Dr. SW, Ste. 206
Lakewood, WA 98499

County Executive (Pierce County)
930 Tacoma Avenue So., Rm. 737
Tacoma, WA 98402-2102

County Commissioner

Pierce County Board of County Commissioners
City-County Building
930 Tacoma Ave., South
Tacoma, WA 98402-2102

Mayors

Mr. Bill Harrison
Mayor, City of Lakewood
Gravelly Lake Dr. SW, Ste. 206
Lakewood, WA 98499-5013

Mr. Bill Baarsma
Mayor, City of Tacoma
747 Market St., Ste 1200
Tacoma, WA 98402-3766

Ms. Jean Brooks
Mayor, City of University Place
3715 Bridgeport Way W
University Place, WA 98466

LIBRARIES

Pierce County Library, Lakewood Branch
6300 Wildaire Road SW
Lakewood, WA 98499

Pierce County Library, Parkland-Spanaway
Branch, 13718 Pacific Avenue South
Tacoma, WA 98444

Moses Lake Community Library
418 E. 5th Ave.
Moses Lake, WA 98837-1750

Base Library
851 Lincoln Blvd. (Bldg 765)
McChord AFB, WA 98438

ORGANIZATIONS

Ms. Linda Smith, Executive Director
Lakewood Chamber of Commerce
P.O. Box 98690
Tacoma, WA 98498-0690

Mr. Al Schmauder
Clover Creek Council
15206-B Fern St. S.W.
Tacoma, WA 98498-1008

President's Office
Pacific Lutheran University
Tacoma, WA 98447

Form A

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, PO Box 3044, Sacramento, CA 95812-3044 916/445-0613

SCH # _____

Project Title: ENVIRONMENTAL ASSESSMENT, WEST COAST BASING OF C-17 AIRCRAFT

Lead Agency: UNITED STATES AIR FORCE, HQ AMC/CSVP Contact Person: LT COL JOHN KEOUGHAN

Street Address: 507 SYMINGTON DRIVE Phone: 618/229-[redacted]0841

City: SCOTT AFB, IL Zip: 62225 County: ST CLAIR

Project Location:

County: SOLANO City/Nearest Community: TRAVIS AFB

Cross Streets: _____ Zip Code: 94535 Total Acres: _____

Assessor's Parcel No. _____ Section: _____ Twp. _____ Range: _____ Base: _____

Within 2 Miles: State Hwy #: _____ Waterways: _____

Airports: TRAVIS AFB Railways: _____ Schools: _____

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.)_____ ☐ Other _____

NEPA: ☐ NOI ☒ EA DRAFT ☐ Draft EIS ☒ FONSI DRAFT **Other:** ☐ Joint Document ☐ Final Document ☒ Other DRAFT FONPA

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan

☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan

☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)

☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other N/A

Development Type:

☐ Residential: *Units*_____ *Acres*_____

☐ Office: *Sq.ft.*_____ *Acres*_____ *Employees*_____

☐ Commercial: *Sq.ft.*_____ *Acres*_____ *Employees*_____

☐ Industrial: *Sq.ft.*_____ *Acres*_____ *Employees*_____

☐ Educational _____

☐ Recreational _____

☐ Water Facilities: *Type*_____ *MGD*_____

☐ Transportation: *Type*_____

☐ Mining: *Mineral*_____

☐ Power: *Type*_____ *Watts*_____

☐ Waste Treatment: *Type*_____

☐ Hazardous Waste: *Type*_____

☒ Other: CONVERT TO AND OPERATE C-17 AIRCRAFT AT TRAVIS AFB

Funding (approx.): Federal $_____ State $_____ Total $_____

Project Issues Discussed in Document:

☐ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☐ Coastal Zone
☐ Drainage/Absorption
☒ Economic/Jobs
☐ Fiscal
☒ Flood Plain/~~Flooding~~
☐ Forest Land/Fire Hazard
☐ Geologic/Seismic
☐ Minerals
☒ Noise
☒ Population/Housing Balance
☐ Public Services/Facilities
☐ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☒ Sewer Capacity
☐ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Wildlife
☐ Growth Inducing
☒ Landuse
☒ Cumulative Effects
☒ Other AIRSPACE/AIRFIELD OPERATIONS

Present Land Use/Zoning/General Plan Designation:

Project Description:

THE AIR FORCE PROPOSES TO BASE 12 C-17 AIRCRAFT AT TRAVIS AFB, REDUCE THE NUMBER OF ASSIGNED C-5S BY 16 AIRCRAFT, AND ACCOMPLISH 16 CONSTRUCTION PROJECTS AT THE BASE.

Revised 3-31-99

Reviewing Agencies Checklist

Form A, continued

KEY
S = Document sent by lead agency
X = Document sent by SCH
✓ = Suggested distribution

_____**Resources Agency**
_____Boating & Waterways
_____Coastal Commission
_____Coastal Conservancy
_____Colorado River Board
_____Conservation
_____Fish & Game
_____Forestry & Fire Protection
_____Office of Historic Preservation
_____Parks & Recreation
_____Reclamation Board
_____S.F. Bay Conservation & Development Commission
_____Water Resources (DWR)

Business, Transportation & Housing
_____Aeronautics
_____California Highway Patrol
_____CALTRANS District #_____
_____Department of Transportation Planning (headquarters)
_____Housing & Community Development

_____**Food & Agriculture**

Health & Welfare
_____Health Services _____

State & Consumer Services
_____General Services
_____OLA (Schools)

Environmental Protection Agency
_____Air Resources Board
_____California Waste Management Board
_____SWRCB: Clean Water Grants
_____SWRCB: Delta Unit
_____SWRCB: Water Quality
_____SWRCB: Water Rights
_____Regional WQCB #_____ (_____)

Youth & Adult Corrections
_____Corrections

Independent Commissions & Offices
_____Energy Commission
_____Native American Heritage Commission
_____Public Utilities Commission
_____Santa Monica Mountains Conservancy
_____State Lands Commission
_____Tahoe Regional Planning Agency

_____Other _____

Public Review Period (to be filled in by lead agency)

Starting Date APRIL 27 - MAY 26, 2003 Ending Date _____

Signature JM Wallin for LtCol John Keasling HQ AMC/CEVP Date 4/22/03

Lead Agency (Complete if applicable):
Consulting Firm: PARSONS
Address: 8000 CENTRE PARK DR
City/State/Zip: AUSTIN, TX 78754
Contact: JOHN WALLIN
Phone: (512) 719-6010

Applicant: HQ AMC/CEVP
Address: 507 SYMINGTON DRIVE
City/State/Zip: SCOTT AFB, IL 62225
Phone: (618) 229-0841

For SCH Use Only:
Date Received at SCH _____
Date Review Starts _____
Date to Agencies _____
Date to SCH _____
Clearance Date _____
Notes:

PARSONS

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099 • www.parsons.com

April 24, 2003

Re: Draft Environmental Assessment, West Coast Basing of C-17 Aircraft
Travis Air Force Base, California and McChord Air Force Base, Washington

The Air Force, with Parsons assistance, has prepared and is pleased to provide you with a copy of the subject report that will be on public review through May 26, 2003. A notice of the availability of this document will appear in the The Reporter, Fairfield Daily Republic, Grant County Journal, and The News Tribune newspapers beginning on April 27, 2003. This document should be made available to the public upon request.

Please confirm that you have received this document by completing this form and faxing it to Lt Col John Keoshian, the Air Force point of contact, at (618) 229-0257. The signed form may also be mailed to Lt Col Keoshian at: HQ AMC/CEVP, 507 Symington Drive, Scott AFB, IL 62225..

Should you have any questions, please call Lt Col Keoshian at (618) 229-0841. Thank you for your assistance.

Sincerely,

John Wallin
Delivery Order Manager

Attachments: 1. Distribution List
2. Draft Environmental Assessment

CONFIRMATION OF RECEIPT:

Signature _____ Date _____

Printed Name _____ Name of Library _____

DISTRIBUTION LIST

Vacaville Public Library
1020 Ulatis Dr.
Vacaville, CA 95687

Fairfield-Suisun Community Library
1150 Kentucky Ave.
Fairfield, CA 94533

Suisun City Library
333 Sunset Ave.
Suisun City, CA 94585

Mitchell Memorial Library
510 Travis Ave. (Bldg 436)
Travis AFB, CA 94535

Base Library
851 Lincoln Blvd. (Bldg 765)
McChord AFB, WA 98438

Pierce County Library
Lakewood Branch
6300 Wildaire Road SW
Lakewood, WA 98499

Pierce County Library
Parkland-Spanaway Branch
13718 Pacific Avenue South
Tacoma, WA 98444

Moses Lake Community Library
418 E. 5th Ave.
Moses Lake, WA 98837-1750

PARSONS

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099 • www.parsons.com

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Travis Air Force Base, California and McChord Air Force Base, Washington

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Sincerely,

John Wallin
Delivery Order Manager

Attachments: 1. Distribution List
2. Draft Environmental Assessment

CONFIRMATION OF RECEIPT:

Susan Gilroy Supervising Library — April 25, 2003
Signature — Date

Susan Gilroy — Mitchell Memorial Library, Travis AFB
Printed Name — Name of Library

PARSONS

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099 • www.parsons.com

April 24, 2003

Re: Draft Environmental Assessment, West Coast Basing of C-17 Aircraft
Travis Air Force Base, California and McChord Air Force Base, Washington

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Please confirm that you have received this document by completing this form and faxing it to Lt Col John Keoshian, the Air Force point of contact, at (618) 229-0257. The signed form may also be mailed to Lt Col Keoshian at: HQ AMC/CEVP, 507 Symington Drive, Scott AFB, IL 62225..

Should you have any questions, please call Lt Col Keoshian at (618) 229-0841. Thank you for your assistance.

Sincerely,

John Wallin
Delivery Order Manager

Attachments: 1. Distribution List
2. Draft Environmental Assessment

CONFIRMATION OF RECEIPT:

Sharon Williamson
Signature

4-25-03
Date

Sharon Williamson
Printed Name

Parkland / Spanaway Br
Pierce County Library
Name of Library

Post-it® Fax Note 7671	Date 4-25-03	# of pages ▶ 1
To Lt Col J. Keoshian	From S Williamson	
Co./Dept. Air Force	Co. P. C. Library	
Phone # 618 229-0841	Phone # 253-531-4659	
Fax # 618 229-0257	Fax # 253-536-3789	

TOTAL P.01

PARSONS

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099 • www.parsons.com

April 24, 2003

Re: Draft Environmental Assessment, West Coast Basing of C-17 Aircraft
Travis Air Force Base, California and McChord Air Force Base, Washington

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Please confirm that you have received this document by completing this form and faxing it to Lt Col John Keoshian, the Air Force point of contact, at (618) 229-0257. The signed form may also be mailed to Lt Col Keoshian at: HQ AMC/CEVP, 507 Symington Drive, Scott AFB, IL 62225..

Should you have any questions, please call Lt Col Keoshian at (618) 229-0841. Thank you for your assistance.

Sincerely,

John Wallin
Delivery Order Manager

Attachments: 1. Distribution List
2. Draft Environmental Assessment

CONFIRMATION OF RECEIPT:

Signature

April 25, 2003
Date

Suzanne Olawski
Printed Name

Suisun City Library
Name of Library

Solano County

Reference Desk

HEART OF SOLANO COUNTY
FAIRFIELD
CALIFORNIA

CITY OF FAIRFIELD

Founded 1856 Incorporated December 12, 1903

DEPARTMENT OF PLANNING AND DEVELOPMENT

Home of
Travis Air Force Base

May 23, 2003

03-05-28P12:57 RCVD

HQ AMC/CEVP
Attention: Lt. Col. John Keoshian
507 Symington Drive
Scott AFB, IL 62225

Re: Draft Environmental Assessment, West Coast Basing of C-17 Aircraft

Dear Lt. Col. Keoshian:

Thank you for the opportunity to comment on the environmental assessment of the basing of C-17 aircraft at Travis AFB. The City of Fairfield strongly supports the proposed action. Further, the Fairfield General Plan policies also support the activities of the airbase and include a special element on Travis AFB protection.

Following are comments that are offered as clarification.

1. The assessment states that a location for the assault landing strip has yet to be determined (pg. 1-5, line 37-38). The City, in conjunction with Solano County, has purchased land southeast of the base, known as Wilcox Ranch. The purpose of this acquisition was to preserve the option for future expansion of the base, including a C-17 assault landing strip and room for a third runway.

2. The assessment references Travis Planning Area Memorandum of Understanding (pg. 3-71, lines 32-33). This joint planning agreement has been terminated because it was determined that development in the area south and east of the base was not feasible.

3. The assessment references Solano County's plans to acquire Wilcox Ranch (pg. 3-77, lines 21-24). As discussed above, the City of Fairfield and Solano County together have purchased the land. A portion of this property is within an area designated in the General Plan as Travis Reserve. The Travis Reserve designation is explained in the next paragraph on page 3-77.

4. On page 3-77, line25, the assessment states that the city recently adopted an updated land use element. This is correct, however, the General Plan update was comprehensive, including the Travis Protection Element.

COUNCIL
Mayor
Karin MacMillan
707.428.7395
Vice-Mayor
Harry T. Price
707.429.6298
Councilmembers
707.429.6298
Jack Batson
John English
Marilyn Farley
• • •
City Manager
Kevin O'Rourke
707.428.7400
• • •
City Attorney
Greg Stepanicich
707.428.7419
• • •
City Clerk
Gina Merrell
707.428.7384
• • •
City Treasurer
Oscar G. Reyes, Jr.
707.428.7497

DEPARTMENTS
Community Services
707.428.7465
• • •
Finance
707.428.7496
• • •
Fire
707.428.7375
• • •
Human Resources
707.428.7394
• • •
Planning &
Development
707.428.7461
• • •
Police
707.428.7551
• • •
Public Works
707.428.7485

5. On page 3-77, line 27, the assessment states that the updated land use element adopts a more stringent noise standard requiring that no residential *development* be located within the CNEL 60 dBA noise contours. The policy actually requires that no new or additional residential *zoning* be adopted within the CNEL 60 dBA noise contours.

6. Table 3.1.7-1, on page 3-58, cites the 2010 projected population of Fairfield as not available. The projected population in 2010 is 113,800. This information should also be available for the other cities in Solano County, either from the cities themselves or from the Association of Bay Area Governments (ABAG).

Again, the city is very much in support of the basing of C-17's at Travis AFB. Should there be any need for further support or additional information, please do not hesitate to contact me.

Sincerely,

SEAN QUINN
Director

SPQ:JKM:ccs

PORT OF MOSES LAKE
GRANT COUNTY INTERNATIONAL AIRPORT
Foreign Trade Zone #203

7810 Andrews St. N.E., Suite 200
Moses Lake, WA, USA 98837-3204
PHONE 509-762-5363
FAX 509-762-2713
E-MAIL info@portofmoseslake.com
WEB SITE www.portofmoseslake.com

30 April 2003

03-05-06A10:09 RCVD

HQ AMC/CEVP
507 Symington Drive
Scott AFB, IL 62225

Dear Sir or Madam:

We anticipate no significant environmental impact in the Grant County International Airport area due to expanded C-17 Operation.

Sincerely,

PORT OF MOSES LAKE

David G. Senne
Executive Manager

DGS:gnh

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

May 29, 2003

Lt. Col. John Keoshian
U.S. Air Force
HQ Air Mobility Command
507 Symington Street
Scott AFB, IL 62225

Subject: Environmental Assessment, West Coast Basing of C-17 Aircraft
SCH#: 2003024007

Dear Lt. Col. John Keoshian:

The State Clearinghouse submitted the above named FONSI to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on May 28, 2003, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2003024007
Project Title Environmental Assessment, West Coast Basing of C-17 Aircraft
Lead Agency U.S. Air Force

Type FON FONSI

Description The Air Force proposes to base 12 C-17 aircraft at Travis Air Force Base, reduce the number of C-5 by 16 aircraft, and accomplish 16 construction projects at the base.

Lead Agency Contact

Name Lt. Col. John Keoshian
Agency U.S. Air Force
Phone 618.229.0841 **Fax**
email
Address HQ Air Mobility Command
507 Symington Street
City Scott AFB **State** IL **Zip** 62225

Project Location

County Solano
City
Region
Cross Streets
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways
Airports Travis AFB
Railways
Waterways
Schools
Land Use

Project Issues Air Quality; Archaeologic-Historic; Economics/Jobs; Flood Plain/Flooding; Noise; Population/Housing Balance; Sewer Capacity; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Landuse; Cumulative Effects; Other Issues

Reviewing Agencies Resources Agency; Department of Conservation; Department of Fish and Game, Region 3; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Services; Caltrans, Division of Aeronautics; Caltrans, District 4; Air Resources Board, Airport Projects; Regional Water Quality Control Board, Region 2; Department of Toxic Substances Control; Native American Heritage Commission

Date Received 04/29/2003 **Start of Review** 04/29/2003 **End of Review** 05/28/2003

Note: Blanks in data fields result from insufficient information provided by lead agency.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
P. O. BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
(510) 286-4454 TDD

Flex your power!
Be energy efficient!

May 23, 2003

RECEIVED
MAY 23 2003
STATE CLEARING HOUSE
Clear 5-28-03

SOL-12-8.89
SOL012193
SCH2003024007

Lt. Col. John Keoshian
United States Air Force
HQ Air Mobility Command
507 Symington Street
Scott Air Force Base, IL 62225

Dear Lt. Col. Keoshian:

WEST COAST BASING OF C-17 AIRCRAFT – DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for including the California Department of Transportation (Department) in the environmental review process for the above-referenced project. We have reviewed the Draft Environmental Assessment and have the following comments:

If work encroaches on the Department's State Route-12 (SR-12) right-of-way (ROW), be advised of the potential for aerially deposited lead contamination due to historic vehicle emissions from leaded gasoline in the unpaved shoulder areas. Any excavation in the unpaved shoulder areas of SR-12 will require appropriate handling and disposal in accordance with regulatory requirements for lead contamination.

Please be advised that any work or traffic control within the State ROW will require an encroachment permit from the Department. To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans (in metric units) which clearly indicate State ROW to the following address:

Mr. Sean Nozzari, District Office Chief
Office of Permits
California Department of Transportation, District 04
P. O. Box 23660
Oakland, Ca 94623-0660

Should you have any questions regarding this letter, please call Lisa Carboni of my staff at (510) 622-5491.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Philip Crimmins (State Clearinghouse)

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

ACKNOWLEDGEMENT OF RECEIPT

DATE: May 2, 2003

TO: Lt. Col. John Keoshian
U.S. Air Force
HQ Air Mobility Command
507 Symington Street
Scott AFB, IL 62225

03-05-06P01:26 RCVD

RE: Environmental Assessment, West Coast Basing of C-17 Aircraft
SCH#: 2003024007

This is to acknowledge that the State Clearinghouse has received your environmental document for state review. The review period assigned by the State Clearinghouse is:

Review Start Date: April 29, 2003
Review End Date: May 28, 2003

We have distributed your document to the following agencies and departments:

Air Resources Board, Airport Projects
Caltrans, District 4
Caltrans, Division of Aeronautics
Department of Conservation
Department of Fish and Game, Region 3
Department of Parks and Recreation
Department of Toxic Substances Control
Department of Water Resources
Native American Heritage Commission
Office of Emergency Services
Office of Historic Preservation
Regional Water Quality Control Board, Region 2
Resources Agency

The State Clearinghouse will provide a closing letter with any state agency comments to your attention on the date following the close of the review period.

Thank you for your participation in the State Clearinghouse review process.

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5513
TTY (800) 735-2929

Flex your power!
Be energy efficient!

03-04-02A11:38 RCVD

March 25, 2003

SOL-12-8.89
SOL012193
SCH# 2003024007

Lt. Col. John Keoshian
United States Air Force
HQ Air Mobility Command
507 Symington Street
Scott Air Force Base, IL 62225

Dear Lt. Col. Keoshian:

WEST COAST BASING OF C-17 AIRCRAFT – ENVIRONMENTAL ASSESSMENT

Thank you for including the California Department of Transportation in the environmental review process for the above-referenced project. We have reviewed the Environmental Assessment, and have the following comment.

Should Travis AFB be selected as the basing option for the 12 C-17 aircraft, what noise and safety impacts will airlift activities have on surrounding State transportation facilities, especially Interstate 80 and State Route 12?

Please call Rick Kuo of my staff at (510) 286-5988 if you have questions regarding this letter.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Brian Grattidge (State Clearinghouse)

PARSONS
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June 9, 2003

Mr. Leaf Hillman
Karuk Tribe of California
P.O. Box 49
Orleans, CA 95556

Dear Sir:

Per your request, enclosed is a copy of the Draft Environmental Assessment for the West Coast Basing of C-17 Aircraft. Please do not hesitate to contact Mr. John Wallin, Project Manager, at (512) 719-6010 or john.wallin@parsons.com if you have any questions.

Very truly yours,

Sherrie G. Keenan

Encl.

Cc: Rosemarie Crisologo

APPENDIX D
CLEAN AIR ACT GENERAL CONFORMITY APPLICABILITY ANALYSIS, WEST COAST BASING OF C-17 AIRCRAFT

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CLEAN AIR ACT
GENERAL CONFORMITY APPLICABILITY ANALYSIS

West Coast Basing of C-17 Aircraft
at Travis AFB, California

DEPARTMENT OF THE AIR FORCE
AIR MOBILITY COMMAND

June 2003

CLEAN AIR ACT
GENERAL CONFORMITY APPLICABILITY ANALYSIS

West Coast Basing of C-17 Aircraft at Travis AFB, California

DEPARTMENT OF THE AIR FORCE
AIR MOBILITY COMMAND

June 2003

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFFF	Aqueous film forming foam
AFRC	Air Force Reserve Command
AGE	Aerospace ground equipment
AGL	Above ground level
AMC	Air Mobility Command
ANG	Air National Guard
AP	Air pollutants
ARC	Air reserve component
AVR	Average vehicle ridership
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CO	Carbon monoxide
EDMS	Emissions and Dispersion Modeling System
FAA	Federal Aviation Administration
FY	Fiscal year
GOV	Government-owned vehicle
HQ AMC	Headquarters, Air Mobility Command
IFR	Instrument flight rules
IR	Instrument route
LTO	Landing take off
m^3	Cubic meter
mg	Milligrams
mph	Miles per hour
MSL	Mean sea level
MTR	Military training route
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NSR	New Source Review
O_3	Ozone

Pb	Lead
$PM_{2.5}$	Particulate matter less than 2.5 microns
PM_{10}	Particulate matter less than 10 microns
POV	Privately owned vehicle
ppm	Parts per million
PSD	Prevention of significant deterioration
SCAQMD	South Coast Air Quality Management District
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SO_X	Sulfur oxides
SR	Slow route
TGO	Touch and go
µg	Micrograms
USEPA	United States Environmental Protection Agency
VFR	Visual flight rules
VR	Visual route
VOC	Volatile organic compound
VMT	Vehicle miles traveled

SECTION 1
CLEAN AIR ACT CONFORMITY

1.1 INTRODUCTION

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to promulgate rules that ensure federal actions conform to the appropriate State Implementation Plan (SIP). These rules are codified in 40 Code of Federal Regulations (CFR) Parts 6, 51, and 93. The SIP is a plan that provides for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). This plan provides emission limitations and control measures to attain and maintain the NAAQS. Conformity to a SIP is defined as being consistent with the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.

The federal agency responsible for a proposed action is required to determine if its actions conform to the applicable SIP. If the action involves the Federal Highway Administration or Federal Transit Authority, it falls under Transportation Conformity Regulations. All other Federal actions fall under General Conformity Regulations. Therefore, the actions planned at Travis Air Force Base (AFB), California fall under the General Conformity rules and must conform to the SIP for the San Francisco Bay Area Air Basin (SFBAAB).

1.2 CONFORMITY BACKGROUND INFORMATION

Section 176(c) of the CAA prohibits federal entities from taking actions in nonattainment or maintenance areas that do not conform to the SIP for the attainment and maintenance of the NAAQS. Therefore, the purpose of conformity is to:

- ensure federal activities do not interfere with the emission budgets in the SIPs;
- ensure federal actions do not cause or contribute to new violations; and,
- ensure attainment and maintenance of the NAAQS.

In November 1993, USEPA promulgated two sets of regulations to implement Section 176(c) of the CAA. First, on November 24, the USEPA promulgated the Transportation Conformity Regulations (applicable to highways and mass transit) to establish the criteria and procedure for determining that transportation plans, programs, and projects funded under Title 23 USC or the Federal Transit Act conform with the SIP (58 CFR 62.188). On November 30, 1993, the USEPA promulgated regulations, known as the General Conformity Regulations (applicable to all other sources), to ensure that other federal actions also conformed to the SIPs (58 CFR 63.214). These regulations are referred to as the Final Conformity Rule.

With respect to general conformity, all federal actions, like the Proposed Action at Travis AFB, are covered unless otherwise exempt. Actions considered exempt from General Conformity Regulations include:

- actions covered by Transportation Conformity;
- actions with clearly *de minimis* emissions;
- exempt actions listed in the rule; and,
- actions covered by a "Presumed to Conform" demonstration (an approved list).

Conformity can be demonstrated by:

- showing emission increases are included in the SIP;
- the affected State agreeing to include increases in the SIP;
- no new violations of NAAQS and/or no increase in the frequency/severity of violations for areas without SIPs;
- offsets; and,
- mitigation.

1.3 GENERAL CONFORMITY DETERMINATION PROCESS

The General Conformity Regulations consist of three major elements – applicability, analysis, and procedure. These three elements are described in the following subsections.

1.3.1 Applicability

Attainment Areas

The General Conformity Rule applies to federal actions occurring in air basins designated as nonattainment for criteria pollutants or areas designated as maintenance areas. Federal actions occurring in air basins in attainment of the NAAQS are not subject to the Conformity Rule.

A criteria pollutant is defined as a pollutant for which federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health and public welfare. A nonattainment area is any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant. A maintenance area is a redesignated nonattainment area for any air pollutant that has attained the national primary ambient air quality standard for that air pollutant. Criteria pollutants and designation of attainment status are further discussed in Sections 3.2 and 3.3.

De Minimis Emissions Levels

To focus conformity requirements on those federal actions with the potential to have significant air quality impacts, threshold (*de minimis*) rates of emissions were established in the Final Rule. With the exception of lead, *de minimis* levels are based on the CAA's major stationary source definitions for the criteria pollutants (and precursor criteria pollutants) and vary by severity of the nonattainment area. A conformity determination is required when the annual total of direct and indirect emissions from a federal action, occurring in a nonattainment or maintenance area, equals or exceeds annual *de minimis* levels.

Table 1-1 lists *de minimis* levels by pollutant applicable for federal actions in non attainment areas, and Table 1-2 presents the levels in maintenance areas. The *de minimis* level for ozone applies to each precursor, volatile organic compounds (VOC) and nitrogen oxides (NO_X). Those levels specific to the SFBAAB are shown in bold italics. The proposed plans for Travis AFB will occur in an area designated as moderate nonattainment for ozone and maintenance for carbon monoxide.

Table 1-1 *De Minimis* Levels for Criteria Pollutants in Nonattainment Areas

Pollutant	Designation	Tons/Year
Ozone*	Serious Nonattainment	50
	Severe Nonattainment	25
	Extreme Nonattainment	10
	Other nonattainment areas outside of ozone transport region	100
	Marginal and moderate nonattainment areas inside ozone transport region	***50/100****
Carbon Monoxide	All nonattainment areas	100
Sulfur Dioxide	All nonattainment areas	100
Lead	All nonattainment areas	25
Nitrogen Dioxide	All nonattainment areas	100
Particulate Matter	Moderate nonattainment	100
	Serious Nonattainment	70

*includes precursors: VOC or NO_X
**VOC/NO_X: applicable to San Francisco Bay Area Air Basin

Table 1-2 *De Minimis* Levels for Criteria Pollutants in Maintenance Areas

Pollutant	Designation	Tons/Year
Ozone (NO_X)	All Maintenance Areas	100
Ozone (VOC)	Maintenance Areas inside an ozone transport region	50
Ozone (VOC)	Maintenance Areas outside an ozone transport region	100
Carbon Monoxide	**All Maintenance Areas**	**100****
Sulfur Dioxide	All Maintenance Areas	100
Lead	All Maintenance Areas	25
Nitrogen Dioxide	All Maintenance Areas	100
Particulate Matter	All Maintenance Areas	100

**CO: applicable to San Francisco Bay Area Air Basin

Regional Significance

A federal action that does not exceed the threshold rates of criteria pollutants may still be subject to the General Conformity Regulations. If a federal action is considered to be "regionally significant," meaning the direct and indirect emissions of any pollutant represent ten percent or more of a nonattainment or maintenance area's emissions inventory for that pollutant, then General Conformity Regulations apply.

Exemptions and Presumptions

The Final Rule contains exemptions from the general conformity process. Certain federal actions are deemed by USEPA to conform because of the thorough air quality analysis required to comply with other statutory requirements. Examples of these actions include those subject to the New Source Review program, and remedial activities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Other federal actions that are exempt from the conformity process include those actions that would result in no increase in emissions, or an increase in emissions clearly *de minimis*. Examples include continuing or recurring activities, routine maintenance and repair, administrative and planning actions, land transfers, and routine movement of mobile assets.

A federal agency can establish its own presumptions of conformity through separate rulemaking actions. Section 176(c) of the CAA does not specifically exempt any activity; thus, a separate analysis would need to show that the activity presumed to conform has no impacts to air quality. Based on this analysis, a federal agency can document that certain types of future actions would be *de minimis*.

1.3.2 Analysis

A conformity analysis for the federal action examines the impacts of the direct and indirect emissions from mobile and stationary sources, and emissions from any reasonably foreseeable federal action. Indirect emissions are those emissions of a criteria pollutant or its precursors that are caused by the federal action but which may occur later in time and/or may be further removed in distance from the action itself, but are still reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected as future indirect emissions identified at the time the conformity analysis is made; the location of such emission is known, and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after review of information presented to it.

The conformity determination procedure is detailed in 40 CFR 51.589. The analysis is based on the latest planning assumptions, latest emission estimation techniques, applicable air quality models, databases, and other requirements of the "Guideline on Air Quality Models (Revised)" (EPA Publication No. 450/2-78-027R, 1986), and based on the total of direct and indirect emissions from the action. Finally, actions that are required to issue a conformity determination must identify mitigation measures and go through a public notice process. Exempt actions are not required to go through this process.

1.3.3 Procedure

Procedural requirements of the conformity rule allow for public review of the federal agency's conformity determination. Although the conformity determination is a federal responsibility, state and local air agencies are provided notification and their expertise is consulted. No documentation or public participation is required for applicability analyses that result in *de minimis* determinations.

The federal agency must provide a 30-day notice of the federal action and draft conformity determination to the appropriate USEPA Region, and state and local air control agencies. The federal agency must also make the draft determination available to the public to allow opportunity for review and comment.

The federal agency should consider aligning the conformity public participation requirements with the public notification requirements of the National Environmental Policy Act (NEPA). However, the Final Rule does not require a concurrent process.

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SECTION 2
DESCRIPTION OF THE FEDERAL ACTION

The Air Force Mobility Force Structure Briefing to Congress on April 15, 2002 presented an airlift Mobility Transformation Plan (the Plan) that proposes to standardize airlift aircraft fleets, increase reliability, lower operating and support costs, and increase airlift capability by 33 percent. The minimum airlift requirement, as determined by the Mobility Requirement Study 2005 to support the national military strategy, requires the ability to airlift 54.5 million ton miles per day, while the current capability is 45.8 million ton miles per day. The Mobility Transformation Plan, which extends through the year 2017, would allow the Air Force to address the increasing demand for airlift with newer, more reliable aircraft and improved overall support.

A total of 53 active duty Air Force and air reserve component (ARC, *i.e.*, Air Force Reserve Command [AFRC] and Air National Guard [ANG]) military installations nationwide would be affected by the Plan outlined in the Mobility Force Structure Briefing. As part of the overall Plan, Headquarters, Air Mobility Command (HQ AMC) at Scott Air Force Base (AFB), Illinois propose to base 12 C-17 aircraft at an active duty west coast Air Force base.

2.1 LOCATION OF THE FEDERAL ACTION

Travis AFB is located in north-central California, approximately 50 miles northeast of San Francisco and 40 miles south of Sacramento. Travis AFB is located adjacent to the City of Fairfield in Solano County. The area surrounding Travis AFB is comprised of rural, residential, and commercial land uses. Figure 2-1 shows the general location of the base.

Travis AFB encompasses 6,258 acres of land and has two parallel runways extending northeast to southwest in the southern portion of the base. The off the installation area south of the runways is primarily open space, while the cantonment area of the base north of the runways has administrative and industrial facilities. Family housing and community facilities are concentrated in the northern part of the base, and the David Grant Medical Center covers a large area along the west-central boundary.

2.2 PURPOSE OF THE FEDERAL ACTION

The purpose of the action is to base 12 C-17 aircraft at an active duty west coast Air Force Base as part of the airlift Mobility Transformation Plan to improve overall airlift capability. As part of the Plan, the Air Force has determined that it is operationally prudent to maintain a robust airlift capability on the west coast to contribute to the overall airlift requirement of 54.5 million ton miles per day. Specifically, basing C-17 aircraft at a west coast location would enhance the capability of the Air Force to meet the national military strategy by modernizing strategic and tactical airlift aircraft on the west coast. Thus, the Air Force has a need to base 12 C-17 aircraft at a west coast base. As part of the Plan, relocating 16 of Travis AFB's 37 C-5 aircraft (leaving 21 C-5 aircraft at the base) to another ARC installation would occur.

2.3 ELEMENTS OF THE FEDERAL ACTION

2.3.1 Airfield and Military Training Route Operations

The C-17 aircraft combines the attributes of a strategic airlifter – long range, aerial refueling, and large payload (including outsize cargo) – with those of a tactical airlifter – agility in the air, survivability, ability to operate on austere airfields with short runways, and the ability to air drop cargo and personnel. A key capability of the C-17 aircraft is that it can land at and take off from short runways called assault landing zones (3,500 feet or less in length).

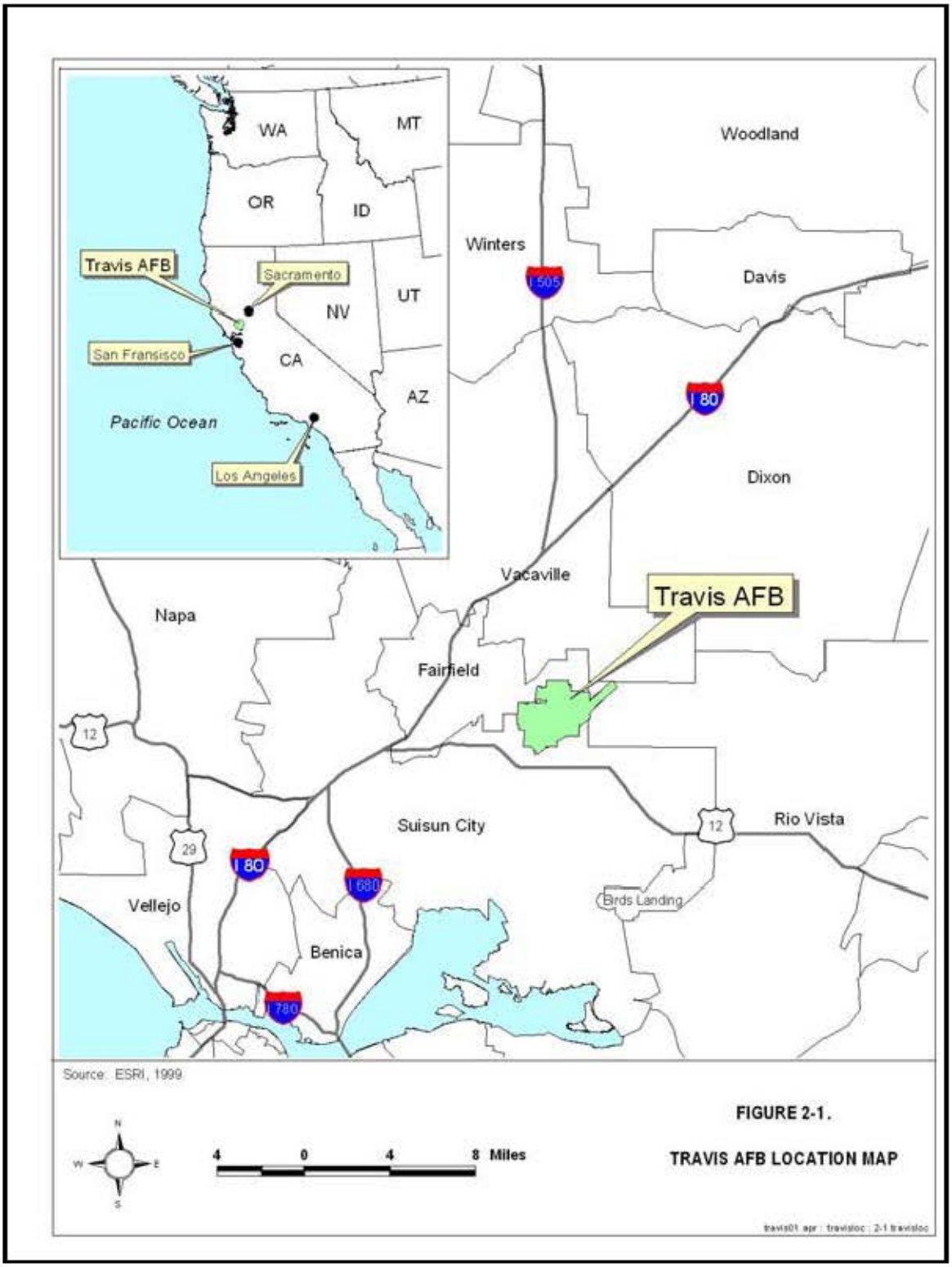
Travis AFB C-17 aircrews would use 19 military training routes (MTR), all of which could be used for low-level navigation training. A typical C-17 training sortie would include a departure, an air refueling, a MTR, and return to Travis AFB. Aircrews would practice takeoffs, landings, instrument approaches and departures, low and missed approaches, and touch and go landings and takeoffs at the Base before sortie termination. Approximately 778 training sorties would be flown annually from Travis AFB by the 12 assigned C-17 aircraft. The proposed airfield operations for Travis AFB are listed in Table 2-1. It is estimated that about 315 annual C-17 mission sorties would be flown where the aircraft depart the base for a worldwide airlift mission that supports the national military strategy. The number of projected C-5 sorties and airfield operations would be about 67 percent of the current levels.

Travis AFB C-17 aircrews would accomplish low-level navigation training on 19 existing MTRs scheduled and coordinated by Air Force, Navy, and Air National Guard units at other Air Force bases and military installations in California. Table 2-2 lists the routes and the proposed number of annual and monthly C-17 operations for each route. The primary routes would be flown more frequently than the secondary routes. There are three types of MTRs. Routes flown using Instrument Flight Rules (IFR) procedures (IR routes) allow aircraft to operate below 10,000 feet above mean sea level (MSL) at speeds in excess of 250 knots (288 mph) along Department of Defense (DoD)/Federal Aviation Administration (FAA) mutually developed and published routes in IFR conditions. Routes flown using Visual Flight Rules (VFR) procedures (VR routes) are guided by the same restrictions as IR routes but are limited to VFR conditions. Slow Routes (SR) are slow speed low altitude training routes that operate below 1,500 feet above ground level (AGL) at airspeeds of 250 knots or less. Only MTRs IR 203 and IR207/208 are in the SFBAAB. Thus, these are the only two MTRs included in this analysis.

2.3.2 Personnel

Aircrews and aircraft maintenance personnel would be assigned to Travis AFB to support the 12 C-17 aircraft. A net loss of 161 active duty and Reserve Associate military and Air Force civilian personnel authorizations would occur as a result of the action.

Figure 2.1 Travis AFB Location Map



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Table 2-1 Airfield Operations, Proposed Action, Travis AFB

Aircraft	Arrivals and Departures		Closed Patterns		Total	
	Annual	Avg. Daily	Annual	Avg. Daily	Annual	Avg. Daily
C- 5 Current	2,454	6.72	22,627	76.70	25,081	83.42
C-5 Proposed	1,642	4.50	15,159	51.39	16,801	55.89
Net Change	-812	-2.22	-7,468	-25.31	-8,280	-27.53
C-17 Current	0	0.00	0	0.00	0	0.00
C-17 Proposed	2,184	6.17	4,807	13.73	6,991	19.90
Net Change	+2,184	+6.17	+4,807	+13.73	+6,991	+19.90

Table 2-2 Military Training Route Operations for Travis AFB

Route	Operations	
	Annual	Monthly
Primary Routes		
IR-203*	62	5
IR-207/208*	62	5
VR-202	62	5
VR-249	62	5
VR-1205	62	5
VR-1215	62	5
SR-300/301	122	10
SR-311/359	86	7
IR-212	26	2
IR-236	26	2
VR-201	26	2
VR-208	24	2
VR-1250	26	2
VR-1252	26	2
VR-1254	26	2
SR-381	24	2
Total	**784**	**63**

*Denotes MTRs included in this analysis

2.3.3 Facility Construction

The Air Force would accomplish 16 construction and building addition/alteration projects to support the beddown and operation of C-17 aircraft at Travis AFB. The following paragraphs briefly describe the construction projects.

- **C-17 Flight Simulator Facility**. The facility would house the aircraft flight simulators and other special training devices used by the aircrews. The building, which would be located in the existing Travis AFB training campus, would also have space for administration and records, a learning center, briefing rooms, a break room, and storage.
- **C-17 Maintenance Training Facility**. The facility would support a variety of technical, specialized C-17 maintenance training programs such as airframe, aircraft controls, and other aircraft systems. The facility would provide space for classrooms, shops, training resources, administration, and special high-bays.
- **C-17 Aerospace Ground Equipment/Storage Facility**. The facility would support maintenance and repair of aircraft support equipment as well as vehicle refueling. The building would include space for works bays, a wash bay, administration, and storage. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system.
- **C-17 Aircraft Parts Store**. The facility would provide space for four components: administration; storage for aircraft parts and components as well as flightline support; warehouse support areas (*e.g*., mechanical); and special storage (*e.g.,* avionics equipment, sensitive materials, and batteries).
- **C-17 Two-Bay Hangar**. The facility would accommodate two C-17 aircraft and would support heavy aircraft maintenance. The facility would have a high expansion foam fire extinguishing system in the maintenance bay area and a water sprinkler system in the administration area. The hangar would have a trench drain to accumulate spilled materials as well as high expansion foam and water fire suppression systems. A containment trench would be constructed to trap the high expansion foam should the chemical be released. The trapped high expansion foam would be pumped from the trench and disposed in accordance with applicable regulatory guidance. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system.
- **C-17 Nose Dock**. The facility would house one C-17 aircraft and would be used for inspections and other aircraft maintenance activities not accomplished in the hangar or on the parking apron. The hangar would have a trench drain in the floor to accumulate spilled materials as well as high expansion foam and water fire suppression systems. The environmental controls would be as described for the hangar (see (5) above).
- **C-17 Squadron Operations/Aircraft Maintenance Unit Facility**. The facility would provide space for command, administration, briefing rooms, flight planning, standardization/evaluation, readiness, and other flying squadron functions, as well as a ready room, readiness, and other aircraft maintenance personnel functions.
- **C-17 Engine Storage Facility**. The facility would provide space for functions such as storage, inspection, and minor maintenance of C-17 engines.

- **C-17 Addition and Alteration to Composite Shop**. The facility would provide space for repair of composite (nonmetallic) materials, plastic carbon reinforced epoxy, honeycomb, and composite/metal-bonded material. The facility would have a triple dry filter system to reduce particulate matter emissions and a filter system to reduce emissions of volatile organic compounds.
- **C-17 Wheel and Tire Shop**. The facility would provide space for the maintenance and repair of aircraft landing gear wheel and tire assemblies as well as assemblies and equipment storage. The wash down trench would have environmental control features to remove petroleum materials from wastewater prior to entry into a wastewater collection system.
- **C-17 Munitions Maintenance Facility**. Two separate buildings would be constructed. One facility would provide space for testing and maintenance of munitions packages used on the C-17 aircraft. The other facility would store munitions.
- **Addition and Alteration to Life Support Shop**. This facility would provide space for three functional activities: life support function office; aircrew training; and life support equipment maintenance and storage. The facility would have an explosives/flare storage vault and a battery/hazardous material waste safety venting area.
- **Electrical, Utilities, and Supporting Infrastructure**. Roads and infrastructure such as the water, wastewater, and electrical systems, would be improved to support the FY03 C-17 construction projects.
- **Taxiway Lima**. Reconstruct Taxiway Lima to support C-17 aircraft.
- **C-17 Roads and Utilities**. Roads and infrastructure such as the water, wastewater, and electrical systems, would be improved to support the FY04 C-17 construction projects. A new South Gate entrance would be constructed to inspect vehicles carrying materials for the C-17 facility construction projects. Another gate would be needed to avoid delays to the high volume of time-critical materials such as concrete should the delivery vehicle have to use other Base gates and encounter lengthy waits due to the security inspections of non-project vehicles entering the Base. The South Gate would be used to provide space for administration and a Base information transfer facility, as well as a canopy over the area in which commercial vehicles would be inspected, after the C-17 construction activity would be complete. Approximately 12.5 acres of land would be acquired to accommodate the South Gate project.
- **Road Adjustment**. A portion of Ragsdale Street would be adjusted. Additionally, other Base roads affected by C-17 construction would be repaired or reconstructed.

Table 2-3 lists the size of the project in square feet, the estimated start dates, and project duration for the each of the 16 projects.

Table 2-3 Construction Project Information, Proposed Action, Travis AFB

Project	Size (Square Feet)	Start Date	Duration
C-17 Flight Simulator Facility	13,750	03	18 months
C-17 Maintenance Training Facility	41,750	06	25 months
C-17 Aerospace Ground Equipment/Storage Facility	33,400	06	18 months
C-17 Aircraft Parts Store	60,000	03	18 months
C-17 Two-Bay Hangar	92,210	07	25 months
C-17 Nose Dock	29,760	06	21 months
C-17 Squadron Operations/Aircraft Maintenance Unit Facility	40,728	03	18 months
C-17 Engine Storage Facility	21,840	06	18 months
C-17 Addition and Alteration to Composite Shop	9,400	07	18 months
C-17 Wheel and Tire Shop	8,120	07	18 months
C-17 Munitions Maintenance Facility	6,000	06	21 months
Addition and Alteration to Life Support Shop	3,800	08	8 months
Electrical, Utilities and Supporting Infrastructure	undetermined	03	18 months
Taxiway Lima Repairs	610,000	07	12 months
C-17 Roads and Utilities	undetermined	05	18 months
Road Adjustment	240,000	08	6 months
Total	1,210,758	NA	NA

Note: :Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable.

The Air Force has 18 other past and reasonably foreseeable actions for Travis AFB that could occur during the same time period as the Proposed Action. Table 2-4 lists the 18 projects. The following paragraphs briefly describe the other actions.

Table 2-4 Construction Project Information, Cumulative Condition, Travis AFB

Project	Size (Square Feet)	Start Date	Duration
Construct Army Recruiting Battalion Facilities	12,152	04	12 months
Construct Coast Guard Facility	103,000	05	30 months
Global Reach Deployment Facility	92,190	04	12 months
Repair Runway 21Left/03 Right Electrical Elements	NA	04	6 months
Construct Combat Arms Campus	18,083	04	12 months
Construct Fire/Crash Rescue Station	30,192	05	12 months
Construct In-flight Kitchen/Fleet Service Facility	23,000	06	12 months
Construct Passenger Terminal	94,519	07	12 months
Construct Fitness Center Addition	43,000	08	12 months
Repair Runway 21Right/03 Left Electrical Elements	NA	08	6 months
Base Civil Engineer Complex	118,877	08	12 months
300 Parking Apron Improvement	2,500,000	04	10 months
Fuel Operations Facilities	60,000	03	18 months
Aerial Port Facility	2,400	02	9 months
Acoustical Support (Band) Facility	25,000	02	12 months
Radar Approach Control Center	31,500	03	10 months
Visitors Quarters	42,353	03	18 months
Repair Travis Avenue	1,100	03	4 months
Total	3,197,366	NA	NA

Note: Size depicts total surface area for the facility. Start date reflected as FY. NA=not applicable.

- **Construct Army Recruiting Battalion Facility**. This project would construct a new building to house the Army Recruiting Battalion that oversees Army recruiting activity through various recruiting offices in northern California. Approximately 46 military and civilian personnel would work in the facility.
- **Construct Coast Guard Facility**. This project would construct command and administration buildings, flying operations, aircraft maintenance, and other support facilities needed to house as many as eight Coast Guard C-130 aircraft that would relocate to Travis AFB. The hangar would have environmental control features identical to those described for the C-17 hangars under the Proposed Action. Approximately 160 Coast Guard personnel would work at the facility. Annually, 4,068 C-130 operations (11.15 average daily operations) would be accomplished at Travis AFB.

- **Construct Global Reach Deployment Facility**. This project would provide space for administration, a high bay warehouse with mezzanines, low bay maintenance shop, washrack/vehicle maintenance facility, and adjacent covered storage. The mission of the 615th Air Mobility Operations Group is to maintain a ready core of AMC mobility support forces required to execute the full spectrum of Global Reach Laydown operations as directed by the Tanker Airlift Control Center.
- **Repair Runway 21Left/03Right Electrical Elements**. This project would construct runway, airfield lighting, fiber-optic communication lines, markers, and a lighting vault.
- **Construct Combat Arms Campus**. This project would construct a facility to be used in conjunction with a small arms firing range system. Functional space includes a classroom area, administrative offices, supply/tool storage, weapons maintenance area, weapons/ammunition storage, target/miscellaneous storage, and mobility/contingency warehouse. This project includes demolition of a 10,549 square foot structure.
- **Construct Fire/Crash Rescue Station**. This project would provide vehicle stalls, offices, communication center, sleeping quarters, training rooms, kitchen, dining room, storage, women's and men's latrines, showers, and locker rooms, mechanical equipment room, and all necessary support. Building 560 (16,436 square feet) would be demolished.
- **Construct In-Flight Kitchen/Fleet Service Facility**. The facility would provide space for refrigerated and dry storage areas, food preparation/support space, including kitchen, utensil wash area, garbage and trash areas, administrative space, lockers/break area for fast food service, small snack bar, and in-flight kitchen. This project includes demolition of a 1,658 square foot concrete structure and a 67,350 square foot wood structure.
- **Construct Passenger Terminal**. This project would provide space for administration, seating, and other functions associated with handling passengers for those aircraft sorties that transport passengers to or from Travis AFB.
- **Construct Fitness Center Addition**. This project would construct an addition to the existing physical fitness center to provide space for weight lifting, ergonometric training, men's and women's locker rooms/showers/latrines, outdoor 25-meter lap pool, bathhouse and multi-purpose exercise training areas. This project would include all necessary and required work, including seismic work. This project includes demolition of a 32,593 square foot facility.
- **Repair Runway 21Right/03Left Electrical Elements**. This project would replace deficient airfield lighting and markers and repair the existing runway.
- **Base Civil Engineering Complex**. The multi-building complex would provide space for command, administration, operations center, resource flight, shop, warehouse, covered/sheltered storage, entomology, disaster preparedness

training; prime base engineer emergency force; air base operability; and readiness warehouse/mobility processing functions in a centralized civil engineering complex.

- **300 Parking Apron Improvement**. Six C-17 parking spots would be reconstructed in the 300 area of the Travis AFB aircraft parking apron. Additionally, the project would repair deteriorated pavements as well as the hydrant fueling system for the 300 area.
- **Fuel Operations Facility.** Two existing above ground storage tanks would be demolished in the fuel storage area. Three above ground tanks (two for jet fuel and one for diesel), all with proper containment provisions, would be constructed in the same area. Additionally, a 60,000 square foot maintenance facility would be demolished to make room for a facility approximately the same size that would provide space for the administration activities associated with fuels management, as well as maintenance and parking.
- **Aerial Port Facility.** The 2,400 square foot facility would house approximately 40-80 personnel currently assigned to Travis AFB and whose duties include loading and off loading of aircraft. The facility would provide space for offices, training, lockers, rest rooms, and a kitchen.
- **Acoustical Support (Band) Facility.** The 25,000 square foot facility would include the following features: acoustically treated rehearsal studios; conference/training rooms; music library; administrative space; restrooms; break rooms; and storage. A parking lot also would be constructed.
- **Radar Approach Control Center.** The 31,500 square foot facility would provide space for the following activities: operations; briefing room; training; administrative space; equipment storage; equipment maintenance; restrooms; and secure storage.
- **Visitor's Center.** The 42,353 square foot facility would provide rooms for aircrew personnel that transit Travis AFB, reservists on active duty at the Base, and personnel relocating to/from the Base. The building would have 242 single occupancy rooms; 100 double guest rooms; eight handicap accessible single rooms; administrative space; supply space; and public restrooms.
- **Repair Travis Avenue.** The project would repair an approximate 2-mile segment of pavement on Travis Avenue from the Base boundary to Burgan Avenue. The project would include widening a 275-foot portion of the avenue by about 4 feet. A median also would be added to the avenue.

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SECTION 3
EXISTING AIR QUALITY

Air quality is characterized by the existing concentrations of various air pollutants, and the climatic and meteorological conditions within an area. Precipitation, wind direction and speed (horizontal airflow), and atmospheric stability (vertical airflow) are factors that determine the extent of pollutant dispersion.

3.1 METEORLOGICAL CONDITIONS

The San Francisco Bay Area is a large shallow basin surrounded by a series of mountain ranges and valleys. Travis AFB is located near the only major break in the coastal mountain range, near the Carquinez Straits. The Sierra-Nevada Mountains, located approximately 60 miles to the east, and the Sacramento and San Joaquin Valleys have a pronounced affect on local weather patterns.

Because of the major break in the coastal mountains, sea breezes often occur during the summer. The average annual wind speed is 9.5 knots. The wind averages 6.6 knots during the winter months and 13.2 knots during the summer months. During June through August, the predominant wind directions are from the southwest and west-southwest and typically have the highest average wind speed of 12.6 knots. The wind direction is more variable during November through February, from the north and southwest, and is calm (less than 1 knot) over 20 percent of the time.

Travis AFB experiences mild temperatures with an average annual temperature of 60 degrees Fahrenheit (°F). The warmest months are July and August with a mean monthly temperature of 72°F, and January is the coldest month with a mean monthly temperature of 46°F.

Temperatures in the atmosphere normally decrease as the altitude increases. Temperature inversions occur when temperatures at higher altitudes are higher than those at lower levels. Inversions in the SFBAAB are frequent. Temperature inversions prevent pollutants from rising and being diluted vertically. Therefore, pollutants remain trapped in the lower layers of air and increase at ground level.

Inversions can occur during the day or night. In the SFBAAB, inversions occur on over 90 percent of summer days, becoming most intense in the afternoons. During the winter, inversions occur on over 70 percent of the nights. The winter inversions are usually dissipated by daytime heating, bringing a rapid improvement to air quality by the afternoon. The heaviest pollution potential in the SFBAAB is during the fall, when both night and daytime inversions may occur together.

The inversion and wind speed together determine the ventilation or dilution factor for an area. Ventilation in the Bay Area is normally adequate to disperse most pollutants. However, poor ventilation during the warm, sunny months fosters development of photochemical ozone, creating a May-to-October ozone season.

3.2 CRITERIA POLLUTANTS AND STANDARDS

The USEPA established NAAQS for six pollutants. Criteria pollutants are defined as those pollutants for which federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria pollutants cause or contribute to air pollution which could endanger the public health or welfare. USEPA has described the potential health and welfare effects of these pollutants. It is on the basis of these criteria and the health and welfare objectives that the standards are set or revised.

The six criteria pollutants with ambient air quality standards are ozone (O_3), particulate matter (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb). Even though ozone is a regulated criteria pollutant, it is not directly emitted from sources. Ozone forms as a result of VOC and oxides of nitrogen (NO_x) reacting with sunlight in the atmosphere.

The California Air Resources Board has developed the California Ambient Air Quality Standards (CAAQS) that are more stringent than the NAAQS. However, the General Conformity rule only addresses the impact of the federal action on the area's attainment of the NAAQS. The NAAQS and the CAAQS for criteria pollutants are shown in Table 3-1.

Air quality is determined by comparing ambient air levels with the appropriate primary or secondary NAAQS for each criteria pollutant. National primary standards establish the level of air quality necessary to allow an adequate margin of safety to protect the public heath. National secondary standards establish the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects a pollutant.

Areas not meeting ambient air quality standards are designated as being in nonattainment for the specific pollutant causing the violation. The CAA Amendments of 1990 further classified O_3, CO, and PM nonattainment areas based on the magnitude of the problem. Depending on the classification (*e.g.,* ozone: marginal, moderate, serious, severe, or extreme), an area must adopt certain air pollution reduction measures. The classification also determines when the area must achieve attainment.

Table 3-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	California Standards Method	Federal Standards Primary	Federal Standards Secondary	Federal Standards Method
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	0.12 ppm (235 µg/m^3)	Same as Primary Standard	Ethylene Chemiluminescence
	8 Hour	---		0.08 ppm (157 µg/m^3)		
Respirable Particulate Matter (PM_{10})	Annual Geometric Mean	30 µg/m^3	Size Selective Inlet Sample ARB Method P (8/22/85)			
	24 Hour	50 µg/m^3		150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean	---		50 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard		65 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean			15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	Non-dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7mg/m^3)		---		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	---	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence

Pollutant	Averaging Time	California Standards Concentration	Method	Federal Standards Primary	Secondary	Method
Lead	1 Hour	0.25 ppm (470 µg/m^3)	AIHL Method 54 (12/74)	---	---	High Volume Sampler and Atomic Absorption
	30 days Average	1.5 µg/m^3		---		
	Calendar Quarter	---		1.5 µg/m^3	Same as Primary Standard	
Sulfur Dioxide (SO_2)	Annual Arimetic Mean	---	Fluorescence	0.030 ppm (80 µg/m^3)	---	Pararosoaniline
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	---	
	3 Hour	---		---	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		---	---	
Visibility Reducing Particles	8 Hour (10 am to 6pm, PST)	In sufficient amount to produce an extinction Coefficient of 0.23 per kilometer – visibility Of ten miles or more (0.07 – 30 miles or more for Lake Tahoe) due to particles when the relative Humidity is less than 70 percent. Method: ARB Method V (8/18/89)			No Federal Standards	
Sulfates	24 Hour	25 µg/m^3	Turbidimetric Barium Sulfate – AIHL Method 61 (2/76)			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Cadmium Hydroxide STRactan			

3.2.1 Ozone

Ozone is not emitted directly into the air but is formed through chemical reactions between natural and man-made emissions of VOC and NO_x in the presence of sunlight. Thus,

VOC and NO_x are referred to as "precursors" of ozone. The level of ozone in the air depends on the outdoor levels of these organic gases, the radiant energy of the sun, and other weather conditions. The primary concern with high ozone concentrations is the damage it causes to human health, vegetation and many common materials used every day. High ozone concentrations can cause shortness of breath, coughing, wheezing, headaches, nausea, eye and throat irritations, and lung damage.

3.2.2 Carbon Monoxide

Carbon monoxide is a colorless, odorless and tasteless toxic gas found naturally in trace quantities in the atmosphere and emitted from any form of combustion. At low concentrations, the central nervous system is affected. At higher concentrations, irritability, headaches, rapid breathing, blurred vision, lack of coordination, nausea and dizziness can all occur. It is especially dangerous indoors when ventilation is inadequate; unconsciousness or death can occur.

3.2.3 Nitrogen Dioxide

Nitrogen dioxide is a reddish-brown to dark brown poisonous gas that produces an irritating odor. It is a byproduct of high combustion sources. Health effects include damage to lungs, bronchial and respiratory system irritation, headaches, nausea, coughing, choking and chest pains.

3.2.4 Sulfur Dioxide

Sulfur dioxide is a colorless gas with a strong suffocating odor. It is a gas resulting from the burning of sulfur-containing fuels. Exposure to SO_2 can irritate the respiratory system including lung and throat irritations and nasal bleeding. In the presence of moisture, SO_2 can form sulfuric acid that can cause damage to vegetation.

3.2.5 Suspended Particulate Matter

There are two categories of particulate matter: particles with diameters less than 10 microns (PM_{10}) and particles with diameters less than 2.5 microns ($PM_{2.5}$) in diameter. Currently, there are only area designations for PM_{10}. The sources of PM_{10} emissions include industrial and agricultural operations, automobile exhaust, and construction. Since PM_{10} is so small, it is not easily filtered and can penetrate to the deeper portions of the lungs. Chronic and acute respiratory illnesses may be caused from inhalation of PM_{10}.

3.2.6 Lead

Lead is a bluish-white to silvery gray solid. Lead particles can originate from motor vehicle exhaust, industrial smelters and battery plants. Health effects include: decreased motor function, reflexes and learning; and damage to the central nervous system, kidneys and brain. At high levels of exposure, seizures, coma or death can occur.

3.3 AIR QUALITY CONTROL REGION

The State of California is divided into a number of areas designated as air basins. Travis AFB is located in the SFBAAB, which includes the counties of Marin, San Francisco,

San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and portions of Sonoma and Solano. The air basin is governed by the Bay Area Air Quality Management District (BAAQMD). Table 3-2 lists the annual air pollutant emissions for the SFBAAB for 2000. This is the most recently available data and is considered as the emissions inventory for this determination.

Table 3-2 2002 Emissions Inventory for San Francisco Bay Area Air Basin (tons)

CO	NO_X	VOCs	SO_X	PM_{10}
1,096,825	236,520	202,210	32,120	82,125

Source: BAAQMD

3.3.1 Attainment Status

Areas not meeting ambient air quality standards are designated as nonattainment for the specific pollutant causing the violation. National standards other than for ozone, particulates, and those based on annual averages, are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98^{th} percentiles is less than 65 $\mu g/m^3$. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

3.3.1.1 Ozone

In 1998, the SFBAAB was classified as nonattainment with the federal 1-hour ozone NAAQS. In 1999, the area was classified as moderate nonattainment for purposes of funding appropriations. For the past 5 years, the 1-hour ozone standard at the Fairfield monitoring site (the site closest to Travis AFB) has been exceeded every year except for 1997 when no exceedances were recorded. Since 1998, the number of 1-hour exceedances has continued to drop from eight in 1998 to one in 2001. The maximum 1-hour concentration exceedance occurred in 1999 with a measurement of 0.129 ppm. According to 40 CFR 81.305, this area remains designated as a moderate nonattainment area for ozone.

In 1997, the USEPA promulgated the 8-hour ozone standard. The SFBAAB has exceeded this standard every year since its inception; however, the number of exceedances has continued to decrease from a high of 16 in 1998 to seven in 2001. The lowest number of exceedances recorded was in 2000 with four. The maximum 8-hour concentration exceedance occurred in 1999 with a measurement of 0.101 ppm. According to 40 CFR 81.305, this area has been designated as unclassified for the 8-hour ozone standard.

3.3.1.2 Particulate Matter

The Bay Area has met national PM_{10} standards since 1992, although the region may not meet the new national $PM_{2.5}$ standards. Monitoring of $PM_{2.5}$ levels is underway to determine the Bay Area's attainment or nonattainment status. Although the Bay Area does not meet California PM_{10} standards, which are much stricter than the national PM_{10} standards; conformity is determined using the national standards. According to 40 CFR 81.305, the Bay Area is currently in attainment for PM_{10} and is unclassified for $PM_{2.5}$.

3.3.1.3 Nitrogen Dioxide

The SFBAAB has better air quality of NO_2 than the national standard. The area has not had one exceedance of the 1-hour federal standard for the past 10 years. According to 40 CFR 81.305, this area has been designated as unclassified or better than national standards.

3.3.1.4 Sulfur Dioxide

Previously, oxides of sulfur were a problem for the Bay Area; however BAAQMD has been controlling the emissions of large oil refineries and chemical plants. As a result, no exceedances of the federal or State standard for sulfur dioxide have been recorded at BAAQMD monitoring stations for the past 25 years. According to 40 CFR 81.305, this area has been designated as better than national standards.

3.3.1.5 Carbon Monoxide

Prior to 1998, the Bay Area was designated as nonattainment for carbon monoxide. In 1998, the Bay Area was redesignated as a maintenance area for attainment for the national 8-hour carbon monoxide standard. Currently, according to 40 CFR 81.305, this area has been designated as attainment in urbanized areas and unclassified/attainment in areas other than urban areas. However, since this area was previously designated as a nonattainment area, the area will still be considered a maintenance area for 25 years.

3.3.1.6 Lead

Although lead is a criteria pollutant, there is no monitoring for lead emissions in the Bay Area. The entire State of California is in attainment for lead. According to 40 CFR 81.305, this area has been designated as attainment.

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SECTION 4
ANALYSIS AND RESULTS

This section includes a comprehensive analysis of the resultant emissions from the federal action planned for Travis AFB. The purpose of this analysis is to determine whether the federal action will conform to the SIP as specified in Section 176(c) of the CAA. A positive conformity determination can be demonstrated by determining that the federal action does not increase emissions with respect to the current emissions. A discussion of the overall analytical methodology, emission changes by sources, and conclusions of general conformity are presented in this section. Appendix A contains supporting documentation for the emission calculations.

4.1 CONFORMITY DETERMINATION METHODOLOGY

4.1.1 Analytical Methods

The methodology for the general conformity analysis for the federal action consisted of the following steps: (1) determine the pollutants of concern based on the attainment status of the air basin; (2) define the scope of the federal action; (3) calculate emissions based on the scope; (4) review net emission changes for threshold levels and regional significance; and (5) determine Conformity for applicable criteria pollutants. Chapter 2 describes the scope of the federal action.

The emission factors applied in the analysis were obtained from the USEPA Compilation of Air Pollutant Emission Factors (AP-42), the California Environmental Quality Act (CEQA) Air Quality Handbook, and the United States Air Force IERA – Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations.

4.1.2 Pollutants of Concern

The area affected by the federal action is in moderate nonattainment for ozone as described in Section 3.3.1.1 and is a maintenance area for carbon monoxide as described in Section 3.3.1.5. Consequently, direct and indirect emissions of VOC and NO_X (precursors to ozone) and carbon monoxide emissions resulting from the federal action are subject to conformity requirements. Thus, the following analysis will focus on only these criteria pollutants.

4.1.3 Applicability

As discussed in Section 1.3.1, if emissions for a criteria pollutant do not exceed the *de minimis* levels specified in the Final Conformity Rule (see Tables 1-1 and 1-2), the federal action conforms for that pollutant. Conversely, if the total direct and indirect emissions of a pollutant are above its *de minimis* value, a formal general conformity determination is required for that pollutant. As will be shown in the following analysis, neither NO_X, VOC, nor CO project emissions will exceed their *de minimis* values.

4.2 CHANGES IN EMISSION AMOUNTS

The federal action will affect the total amount of emissions from several categories of sources. The analysis includes all sources subject to changing emission rates, exclusive of any stationary sources that are subject to review and that may require a permit under the New Source Review (NSR) or Prevention of Significant Deterioration (PSD) programs. The emissions associated with changes in airfield operations, aerospace ground equipment (AGE) operations, aircraft trim/power checks, vehicle operations, construction activity, and MTR operations are included in the analysis.

The schedule for C-17 aircraft arrivals at Travis AFB is approximately one per quarter or four per year. The departure schedule for C-5 aircraft is approximately six for the first year and five per year for the remaining two years, for a total of 16 aircraft.

4.2.1 Airfield Operations

Airfield operations generate the highest volume of criteria pollutant emissions at Travis AFB. The federal action will result in a change in the numbers and types of aircraft at Travis AFB. Airfield operations from these changes will constitute the highest rate of change in emissions for all pollutants except CO for this conformity analysis.

4.2.1.1 Methodology

The aircraft changes for Travis AFB and the types of aircraft that will be assigned to the base were used to calculate emission rates. The rate of emissions varies according to the type of aircraft operation. The analysis is based on two types of activities: landing-and-takeoff operations (LTO); and, touch-and-go operations (TGO). LTO and TGO operations data for the C-5s and C-17s were obtained from Travis AFB operations personnel and the 1997 Air Emissions Survey Report for Travis AFB. Emission factors were taken from the United States Air Force IERA – Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations.

Modal emission rates are pollutant emission factors by type of aircraft operation such as taxi/idle, takeoff, climbout, and approach. Total taxi/idle times were based upon AP-42 modal times. Emissions can be calculated by using the time an aircraft spends in each mode, the number of engines on the aircraft, the number of operations, and the modal emission rate. Emissions from TGOs were calculated similar to the LTOs, except that emissions resulting from taxi/idle were excluded since these modes are not part of a TGO.

Emissions from aircraft refueling are expected to be reduced. The C-5 aircraft has a fuel tank capacity of 51,150 gallons and a nautical mile (NM) range of approximately 2,150 NMs. The C-17 aircraft has a NM range of approximately 2,400 NMs and an aircraft fuel tank capacity estimated at approximately 57,100 gallons. Since 16 C-5 aircraft will be removed from Travis AFB (approximately 818,400 gallons of fuel capacity) and 12 C-17 aircraft will be added to Travis AFB's fleet (approximately 685,200 gallons of fuel capacity), and since the number of flights using the C-17 is expected to be less than the C-5 aircraft, a reduction in refueling emissions is expected.

4.2.1.2 Results

The total airfield operations emission changes were calculated for the different components of the federal action. Table 4-1 summarizes the anticipated cumulative net airfield operations emission changes. The results show a decrease in CO, NO_X, and VOC emissions. PM_{10} emissions increase slightly while SO_X emissions remain unchanged..

Table 4-1 Summary of Results for Airfield Operations Emissions

	Pollutants Emitted (tons/year)				
	CO	NO_X	VOC	SO_X	PM_{10}
Current Condition (FY 03)[a]	123	1,808	44	0	79
FY 04 [b]	-6	-121	-4	0	6
FY 05 [c]	-6	-121	-4	0	6
FY 06 [d]	-6	-120	-4	0	6
Net Emissions*	-18	-362	-12	0	18
Annual Total, FY 06 [e]	105	1,446	32	0	97

a: Current Condition is 37 C-5 aircraft and 0 C-17 aircraft

b: FY 04 = Reduce C-5 by 6 aircraft for a total of 31 C-5 aircraft and add 4 C-17 aircraft for a total of 4 C-17 aircraft

c: FY 05 = Reduce C-5 by 5 aircraft for a total of 26 C-5 aircraft and add 4 C-17 aircraft for a total of 8 C-17 aircraft

d: FY 06 = Reduce C-5 by 5 aircraft for a total of 21 C-5 aircraft and add 4 C-17 aircraft for a total of 12 C-17 aircraft

e: Represents baseline plus net emissions.

*Negative number indicates a reduction in emissions

4.2.2 Aerospace Ground Equipment

Aerospace ground equipment is internal combustion and turbine engines used for ground support of aircraft. Ground support includes activities such as testing, maintenance, and minor repair work. Additional AGE will be operating at Travis AFB in support of the C-17 aircraft. However, since there will be fewer C-5 aircraft, AGE operations to support the aircraft will decrease.

4.2.2.1 Methodology

Emission estimates were calculated using emissions dispersion and modeling system (EDMS). The number and type of AGE units associated with the C-5 and C-17 aircraft were obtained from the default list used by EDMS for each type of aircraft.

4.2.2.2 Results

Table 4-2 summarizes the net emission changes expected from AGE operations. Emissions associated with C-17 AGE operation are higher than those for the C-5 aircraft. As a result, AGE emission rates are higher with the proposed combination of C-17 and C-5 aircraft than with the C-5s alone.

Table 4-2 Summary of Results for Aircraft AGE Operation Emissions

	Pollutants Emitted (tons/year)				
	CO	NO_X	VOC	SO_X	PM_{10}
Current Condition (FY 03)[a]	97.535	1.414	3.898	0.015	0.101
FY 04 [b]	6.477	0.244	0.673	0.003	0.018
FY 05 [c]	7.254	0.273	0.753	0.003	0.019
FY 06 [d]	7.254	0.273	0.753	0.003	0.019
Net Emissions*	20.985	0.790	2.179	0.009	0.056
Annual Total [e]	118.520	2.204	6.077	0.024	0.157

a: Current Condition is 37 C-5 aircraft and 0 C-17 aircraft

b: FY 04 = Reduce C-5 by 6 aircraft for a total of 31 C-5 aircraft and add 4 C-17 aircraft for a total of 4 C-17 aircraft

c: FY 05 = Reduce C-5 by 5 aircraft for a total of 26 C-5 aircraft and add 4 C-17 aircraft for a total of 8 C-17 aircraft

d: FY 06 = Reduce C-5 by 5 aircraft for a total of 21 C-5 aircraft and add 4 C-17 aircraft for a total of 12 C-17 aircraft

e: Represents baseline plus net emissions.

*Positive number indicates an increase in emissions

4.2.3 Aircraft Trim/Power Checks

Routine engine trim/power checks on C-5 and C-17 aircraft will be performed at Travis AFB. Trim checks are used to test aircraft engines, and include running the engines at various power settings. The trim checks are conducted with the engines remaining on the aircraft.

4.2.3.1 Methodology

Trim/power check emissions are determined by multiplying the number of aircraft engines being tested by the emission factors for each mode or power setting (idle, approach, intermediate, military), the duration of the test at each power setting, and the number of tests over a specified time period.

Modal emission rates for the C-5 and C-17 aircraft were obtained from the United States Air Force IERA – Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations. Information on the number of trim tests performed each year and the duration of the test at various power settings were obtained from the 1997 Air Emissions Survey Report for Travis AFB. The number of trim tests is based upon testing each engine on each aircraft. Therefore, for the C-5 aircraft, 84 tests were anticipated (four engines on 21 aircraft). Similarly, for the C-17 aircraft, 48 tests were anticipated (four engines on 12 aircraft).

4.2.3.2 Results

Table 4-3 summarizes the net emission changes from engine testing. Since the emission factors for C-5 and C-17 aircraft are similar, there is a slight decrease overall because the total number of aircraft would decrease. The overall reduction in trim/power check emissions is negligible.

Table 4-3 Summary of Results for Trim/Power Check Emissions

	Pollutants Emitted (tons/year)				
	CO	NO_X	VOC	SO_X	PM_{10}
Current Condition (FY 03)[a]	13	107	4	0	5
FY 04 [b]	-2	-12	-1	0	0
FY 05 [c]	-3	-20	-1	0	0.6
FY 06 [d]	-4	-27	-2	0	1
Net Emissions*	-9	-59	-3	0	-2
Annual Total [e]	4	48	1	0	3

a: Current Condition is 37 C-5 aircraft and 0 C-17 aircraft

b: FY 04 = Reduce C-5 by 6 aircraft for a total of 31 C-5 aircraft and add 4 C-17 aircraft for a total of 4 C-17 aircraft

c: FY 05 = Reduce C-5 by 5 aircraft for a total of 26 C-5 aircraft and add 4 C-17 aircraft for a total of 8 C-17 aircraft

d: FY 06 = Reduce C-5 by 5 aircraft for a total of 21 C-5 aircraft and add 4 C-17 aircraft for a total of 12 C-17 aircraft

e: Represents baseline plus net emissions.

*Negative number indicates a decrease in emissions

4.2.4 Motor Vehicle Travel

Motor vehicle travel includes emissions from privately-owned vehicles (POV) commuting to the base and government-owned vehicles (GOV) used primarily on Travis AFB. Emission sources included are motorcycles, cars, and passenger trucks. Examples of GOVs include sedans, station wagons, buses, panel vans, carry-alls, and trucks (passenger, utility, and heavy-duty trucks).

Since there will be a reduction of 161 personnel authorizations at Travis AFB (when compared to the current 14,357 authorizations), there will be a slight reduction in motor vehicle emissions. The overall reduction in motor vehicle emissions is negligible.

4.2.5 Construction

New construction, demolition, and additions/alterations to existing facilities and utilities are planned to support the C-17 mission at Travis AFB. Emissions from construction activity are considered area emissions, although short-term, while emissions from vehicles supporting construction are considered mobile sources.

4.2.5.1 Methodology

Methodology and emission factors provided in Chapter 9 of the CEQA Air Quality Handbook were used to estimate construction emissions since BAAQMD does not have specific emission factors for construction projects.

Emission factors from Table 9-1 of the Handbook for "Industrial" facilities were used. These factors include on-site construction equipment and workers' travel. Construction of

roads and utilities could not be determined since specific data related to those projects are undetermined at this time.

Two phases of construction would occur as a result of the proposed project. Sixteen facilities would be constructed at Travis AFB to support C-17 aircraft basing and operation. The Air Force has 18 other past and reasonably foreseeable actions for Travis AFB that could occur during the same period as the proposed action. The emissions were combined to arrive at an emissions estimate for the entire project.

4.2.5.2 Results

Table 4-4 summarizes the net emission changes from anticipated construction activities. The overall increase in construction emissions is negligible.

Table 4-4 Summary of Results for Construction Emissions

Type of Construction	Pollutants Emitted (tons/year)				
	CO	NO_X	VOC	SO_X	PM_{10}
16 C-17 Support Activities	0.749	3.442	0.234	0	0.244
18 Cumulative Actions	0.678	3.117	0.212	0	0.221
Net Emissions*	1.427	6.559	0.446	0	0.465

*Positive number indicates an increase in emissions

4.2.6 Military Training Routes

Military Training Route operations are not currently conducted by Travis AFB aircrews. Therefore, the addition of MTR operations will result in an increase in emissions. There are only two MTRs that will affect the SFBAAB as result of implementing the proposed project; IR 203 and IR 207.

4.2.6.1 Methodology

The one-way distances traveled in the SFBAAB by C-17s operating on IR 203 and IR 207 were calculated to be 157.5 NMs and 142.5 NMs, respectively. Travel speeds were assumed to be 350 knots at an altitude of 300 feet above ground level. Emission factors were taken from the United States Air Force IERA – Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations.

4.2.6.2 Results

Table 4-5 summarizes the emissions associated from the MTR operations. As mentioned in Section 4.2.6, the overall emissions are higher since no MTR operations are currently accomplished by Travis AFB aircrews.

Table 4-5 Summary of Results for Military Training Route Operations Emissions

	Pollutants Emitted (tons/year)				
	CO	**NO_X**	**VOC**	**SO_X**	**PM_{10}**
Current Condition (FY 03)[a]	0	0	0	0	0
FY 04 IR 203[b]	0.06	5.13	0.04	0	0.39
FY 04 IR 207	0.06	4.64	0.03	0	0.36
FY 05 IR 203[c]	0.06	5.38	0.04	0	0.41
FY 05 IR 207	0.06	4.87	0.03	0	0.37
FY 06 IR 203[d]	0.06	5.38	0.04	0	0.41
FY 06 IR 207	0.06	4.87	0.03	0	0.37
Net Emissions	0.36	30.27	8.21	0	2.33
Annual Total	0.36	30.27	8.21	0	2.33

a: No MTRs are being performed under the Current Condition. The Current Condition is 37 C-5 aircraft and 0 C-17 aircraft

b: FY 04 = Add 4 C-17 aircraft for a total of 4 C-17 aircraft

c: FY 05 = Add 4 C-17 aircraft for a total of 8 C-17 aircraft

d: FY 06 = Add 4 C-17 aircraft for a total of 12 C-17 aircraft

4.2.7 Summary of Results

Table 4-6 summarizes the net emissions from airfield operations, AGE operation, trim/power checks on aircraft engines, construction, and MTR operations. Table 4-7 compares the net emissions from Table 4-6 with the SFBAAB emissions inventory.

Table 4-6 Summary of Results for All Emissions

Category	Pollutants Emitted (tons/year)				
	CO	**NO_X**	**VOC**	**SO_X**	**PM_{10}**
Airfield Operations	-18	-362	-12	0	18
AGE Operation	20.985	0.790	2.179	0.009	0.056
Trim/Power Checks	-9	-59	-3	0	-2
Construction	1.426	6.559	0.446	0	0.465
Military Training Route Operations	0.36	30.27	8.21	0	2.33
Net Emissions*	**-4.229**	**-383.381**	**-4.165**	0.009	18.851

* Negative number indicates a decrease in emissions
Bold indicates pollutants of concern for Travis AFB Conformity Determination

Table 4-7 Comparison of Project Emissions and Emissions Inventory

Category	Pollutants Emitted (tons/year)				
	CO	NO_X	VOC	SO_X	PM_{10}
SFBAAB Emissions Inventory	1,096,825	236,520	202,210	32,120	82,125
Project Emissions	**-4.229**	**-383.381**	**-4.165**	0.009	18.851
Percent Change	**-0.00039%**	**-0.16209%**	**-0.00206%**	+0.00003%	+0.02295%

4.3 CONFORMITY DETERMINATION RESULTS

4.3.1 *De Minimis* Levels

As discussed in Section 1.3.1, if the total direct and indirect emissions of a pollutant from the federal action exceed the *de minimis* rate established in the Final Conformity Rule, then a Conformity determination is required. Table 4-6 summarizes the proposed action emissions. Emissions for the criteria pollutants of interest, NO_X and VOC – the precursors of ozone, decrease by 383.381 and 4.165 tons per year, respectively, as a result of the project. Likewise, emissions for carbon monoxide decrease by 4.229 tons per year as a result of the proposed action. Since the emissions for each of the criteria pollutants of interest decrease, all are below the *de minimis* levels for the respective pollutant (see Tables 1-1 and 1-2). For criteria pollutants that do not exceed their respective *de minimis* levels, the federal action is presumed to conform to the applicable SIP for each particular pollutant unless it is shown to be of regional significance.

4.3.2 Regional Significance

When the total emissions of the nonattainment criteria pollutants do not exceed the *de minimis* rates, the emissions must then be compared to the air quality emissions inventory of the air basin to determine regional significance of the Federal action. If the amount of emissions is greater than 10 percent of the emissions inventory, then the federal action is considered regionally significant for that particular pollutant. Regionally significant actions must be further reviewed to determine conformity. Since all of the criteria pollutants of interest decrease as a result of this project, none of them represent an increase of 10 percent or more of the emissions inventory.

4.4 CONCLUSION

The federal action proposed for Travis AFB will occur within an air basin designated as moderate nonattainment for ozone. The General Conformity Rule extends to the precursors of ozone. Thus, this conformity analysis focuses on only the criteria pollutants of VOC, NO_X, and carbon monoxide. The analysis of direct and indirect emission changes from mobile and stationary sources and reasonably foreseeable and controllable actions support a positive conformity determination for the federal action.

The total of direct and indirect emissions of VOC, NO_X, and carbon monoxide are below the *de minimis* levels established for these pollutants. These emissions would be less than 10 percent of the applicable emissions inventory. Therefore, the action would not be considered regionally significant. It has been determined that the federal action planned for

Travis AFB positively conforms to the applicable SIP for the SFBAAB. The Air Force is supporting an activity that has been demonstrated by USEPA standards not to cause or contribute to new violations of any national ambient air quality standard in the affected area, nor increase the frequency or severity of an existing violation. Implementation of the Federal action will not delay timely attainment of the ozone and CO standards in the Bay Area, and the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP. This conclusion of positive general conformity determination for the Federal action planned for Travis AFB fulfills the Air Force's obligation and responsibility under 40 CFR Part 93, Subpart B.

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SECTION 5
REFERENCES

1. Bay Area Air Quality Management District, 1999 CEQA Guidelines
2. Bay Area Air Quality Management District web page
3. Bay Area 2000 Clean Air Plan and Triennial Assessment, December 20, 2000
4. San Francisco Bay Area Transportation Air Quality Conformity Procedures, December 1996.
5. Clean Air Act General Conformity Determination, Realignment of Travis Air Force Base California, June 1994
6. Air Emissions Survey Report, Travis Air Force Base, December 1997.
7. South Coast Air Quality Management District, 1993 CEQA Guidelines
8. California Air Resources Board web page
9. Environmental Protection Agency web page
10. Travis Air Force Base web page
11. 40 Code of Federal Regulations, Part 93
12. 40 Code of Federal Regulations, Part 51
13. Computer Program – EDMS - Emissions and Dispersion Modeling System

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APPENDIX A
EMISSIONS CALCULATIONS

OVERALL

BASELINE CALCULATIONS

TRAVIS BASELINE AIRCRAFT OPERATIONS ACTIVITIES

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	1227		9.2	0.153333			1.8307	31.7159	8.9519	1.4983
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	1227	22627	0.4	0.006667	1.2	0.02	417.1361	16.3483	0.0000	15.0711
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	1227	22627	1.2	0.02	1.2	0.02	336.9660	19.5048	0.0000	10.6498
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	1227	22627	5.1	0.085	5.1	0.085	1,050.2569	32.7143	28.4657	50.5585
	Taxi/Idle-in	Idle	1,448	3.36	58.21	16.43	2.75	1227		6.7	0.111667			1.3332	23.0975	6.5193	1.0912
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**1,808**	**123**	**44**	**79**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)															

PROPOSED ACTION CALCULATIONS

TRAVIS PROPOSED AIRCRAFT OPERATIONS ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	1092		9.2	0.153333			1.4640	8.8212	0.7949	3.8967
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	1092	4807	0.4	0.006667	1.2	0.02	99.1543	1.1563	0.0867	6.6777
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	1092	4807	1.2	0.02	1.2	0.02	77.3449	0.9275	0.5411	5.9516
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	1092	4807	5.1	0.085	5.1	0.085	55.9132	5.3639	1.2873	23.6869
	Taxi/Idle-in	Idle	1,104	3.96	23.86	2.15	10.54	1092		6.7	0.111667			1.0662	6.4242	0.5789	2.8378
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**235**	**23**	**3**	**43**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)															

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	821		9.2	0.153333			1.2249	21.2215	5.9898	1.0026
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	821	15159	0.4	0.006667	1.2	0.02	279.4549	10.9523	0.0000	10.0967
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	821	15159	1.2	0.02	1.2	0.02	225.7364	13.0664	0.0000	7.1344
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	821	15159	5.1	0.085	5.1	0.085	703.5761	21.9156	19.0694	33.8696
	Taxi/Idle-in	Idle	1,448	3.36	58.21	16.43	2.75	821		6.7	0.111667			0.8921	15.4548	4.3622	0.7301
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**1,211**	**83**	**29**	**53**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)															

	NOx	CO	VOC	Total PM
TOTAL EMISSIONS:	1,446	105	33	96

	NOx	CO	VOC	Total PM
DIFFERENCE IN TOTAL EMISSIONS (tpy):	-362	-18	-11	17

FY 04 Calculations - 31 C-5 and 4 C-17 Aircraft

TRAVIS BASELINE AIRCRAFT OPERATIONS ACTIVITIES

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	1092		9.2	0.153333			1.6293	28.2264	7.9670	1.3335
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	1092	20138	0.4	0.006667	1.2	0.02	371.2504	14.5499	0.0000	13.4132
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	1092	20138	1.2	0.02	1.2	0.02	299.8989	17.3592	0.0000	9.4783
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	1092	20138	5.1	0.085	5.1	0.085	934.7260	29.1157	25.3344	44.9969
	Taxi/Idle-in	Idle	1,448	3.36	58.21	16.43	2.75	1092		6.7	0.111667			1.1865	20.5562	5.8021	0.9711
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**1,609**	**110**	**39**	**70**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)													

PROPOSED ACTION CALCULATIONS

TRAVIS PROPOSED AIRCRAFT OPERATIONS ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	364		9.2	0.153333			0.4880	2.9404	0.2650	1.2989
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	364	1602	0.4	0.006667	1.2	0.02	33.0514	0.3854	0.0289	2.2259
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	364	1602	1.2	0.02	1.2	0.02	25.7816	0.3092	0.1804	1.9839
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	364	1602	5.1	0.085	5.1	0.085	18.6377	1.7880	0.4291	7.8956
	Taxi/Idle-in	Idle	1,104	3.96	23.86	2.15	10.54	364		6.7	0.111667			0.3554	2.1414	0.1930	0.9459
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**78**	**8**	**1**	**14**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)													

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS FY04:	**1,687**	**117**	**40**	**85**

FY 05 Calculations - 26 C-5 and 8 C-17 Aircraft

TRAVIS BASELINE AIRCRAFT OPERATIONS ACTIVITIES

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	956		9.2	0.153333			1.4264	24.7110	6.9748	1.1674
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	956	17649	0.4	0.006667	1.2	0.02	325.3587	12.7514	0.0000	11.7552
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	956	17649	1.2	0.02	1.2	0.02	262.8176	15.2128	0.0000	8.3064
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	956	17649	5.1	0.085	5.1	0.085	819.1511	25.5156	22.2019	39.4332
	Taxi/Idle-in	Idle	1,448	3.36	58.21	16.43	2.75	956		6.7	0.111667			1.0388	17.9961	5.0795	0.8502
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**1,410**	**96**	**34**	**62**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)											

PROPOSED ACTION CALCULATIONS

TRAVIS PROPOSED AIRCRAFT OPERATIONS ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	728		9.2	0.153333			0.9760	5.8808	0.5299	2.5978
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	728	3205	0.4	0.006667	1.2	0.02	66.1029	0.7709	0.0578	4.4518
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	728	3205	1.2	0.02	1.2	0.02	51.5633	0.6183	0.3607	3.9677
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	728	3205	5.1	0.085	5.1	0.085	37.2754	3.5759	0.8582	15.7913
	Taxi/Idle-in	Idle	1,104	3.96	23.86	2.15	10.54	728		6.7	0.111667			0.7108	4.2828	0.3859	1.8919
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**157**	**15**	**2**	**29**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)											

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS FY05:	**1,566**	**111**	**36**	**90**

FY 06 Calculations - 21 C-5 and 12 C-17 Aircraft

TRAVIS BASELINE AIRCRAFT OPERATIONS ACTIVITIES

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	821		9.2	0.153333			1.2249	21.2215	5.9898	1.0026
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	821	15159	0.4	0.006667	1.2	0.02	279.4549	10.9523	0.0000	10.0967
# Engines	Climbout	ntermediat	12,541	28.16	1.63	0	0.89	821	15159	1.2	0.02	1.2	0.02	225.7364	13.0664	0.0000	7.1344
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	821	15159	5.1	0.085	5.1	0.085	703.5761	21.9156	19.0694	33.8696
	Taxi/Idle-in	Idle	1,448	3.36	58.21	16.43	2.75	821		6.7	0.111667			0.8921	15.4548	4.3622	0.7301
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**1,211**	**83**	**29**	**53**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)											

PROPOSED ACTION CALCULATIONS

TRAVIS PROPOSED AIRCRAFT OPERATIONS ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				LTO (# of landing and takeoff)	TGO (# of touch and go)	LTO Time in Mode		TGO Time in Mode		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM			(min)	(hr)	(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	1092		9.2	0.153333			1.4640	8.8212	0.7949	3.8967
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	1092	4807	0.4	0.006667	1.2	0.02	99.1543	1.1563	0.0867	6.6777
# Engines	Climbout	ntermediat	10,919	30.02	0.36	0.21	2.31	1092	4807	1.2	0.02	1.2	0.02	77.3449	0.9275	0.5411	5.9516
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	1092	4807	5.1	0.085	5.1	0.085	55.9132	5.3639	1.2873	23.6869
	Taxi/Idle-in	Idle	1,104	3.96	23.86	2.15	10.54	1092		6.7	0.111667			1.0662	6.4242	0.5789	2.8378
	APU Start													0.0000	0.0000	0.0000	0.0000
Project Emissions														**235**	**23**	**3**	**43**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x LTO x No. Engines x TIM (hr) x (tons/2000 lb) + Fuel Consumpt (lb/hr) x Emission Rate (lb/1000 lb) x TGO x TIM (hr) x (tons/2000 lb)											

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS FY06:	**1,446**	**105**	**33**	**96**

Aircraft Operations Summary									
	Aircraft Operations Emissions				Change from Baseline				
	NOx	CO	VOC	Tot PM	NOx	CO	VOC	Total PM	
Baseline	1,808	123	44	79	0	0	0	0	Baseline
FY04	1,687	117	40	85	-121	-6	-4	6	FY04
FY05	1,566	111	36	90	-121	-6	-4	6	FY05
FY06	1,446	105	33	96	-121	-6	-4	6	FY06
Net:					-362	-18	-11	17	

MTRs OVERALL

Travis
1 inch = 60 NM

IR 203 = 2.625 inches
IR 207 = 2.375 inches

MTR #	Map Distance (inches)	Distance (nautical miles)	Speed (mi/hour)	Time in Mode (hours)
IR - 203	2.625	157.50	402.78	0.39
IR - 207	2.375	142.50	402.78	0.35
Total Aircraft Time in Mode @ AQCR San Francisco Bay Area Basin				

Speed (knots)
350

MTR #	Power setting	Fuel Consumption Rate (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# of Ops per MTR	Total A/C Time in Mode (hr)	Total Emissions (tons/year)			
			NOX	CO	VOC	Total PM			NOX	CO	VOC	Total PM
IR - 203	Intermediate	10,919	30.02	0.36	0.21	2.31	62	0.39	15.89	0.19	0.11	1.22
IR - 207	Intermediate	10,919	30.02	0.36	0.21	2.31	62	0.35	14.38	0.17	0.10	1.11
Total Emissions for AQCR San Francisco Bay Area Basin									**30.27**	**0.36**	**0.21**	**2.33**

FY04

Travis

1 inch = 60 NM IR 203 = 2.625 inches

IR 207 = 2.375 inches

MTR #	Map Distance (inches)	Distance (nautical miles)	Speed (mi/hour)	Time in Mode (hours)
IR - 203	2.625	157.50	402.78	0.39
IR - 207	2.375	142.50	402.78	0.35

Total Aircraft Time in Mode @ AQCR San Francisco Bay Area Basin

MTR #	Power setting	Speed (knots) 350 Fuel Consumption Rate (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# of Ops per MTR	Total A/C Time in Mode (hr)	Total Emissions (tons/year)			
			NOX	CO	VOC	Total PM			NOX	CO	VOC	Total PM
IR - 203	Intermediate	10,919	30.02	0.36	0.21	2.31	20	0.39	5.13	0.06	0.04	0.39
IR - 207	Intermediate	10,919	30.02	0.36	0.21	2.31	20	0.35	4.64	0.06	0.03	0.36
Total Emissions for AQCR San Francisco Bay Area Basin									**9.77**	**0.12**	**0.07**	**0.75**

FY05

Travis

1 inch = 60 NM IR 203 = 2.625 inches

IR 207 = 2.375 inches

MTR #	Map Distance (inches)	Distance (nautical miles)	Speed (mi/hour)	Time in Mode (hours)
IR - 203	2.625	157.50	402.78	0.39
IR - 207	2.375	142.50	402.78	0.35

Total Aircraft Time in Mode @ AQCR San Francisco Bay Area Basin

Speed (knots) 350

MTR #	Power setting	Fuel Consumption Rate (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# of Ops per MTR	Total A/C Time in Mode (hr)	Total Emissions (tons/year)			
			NOX	CO	VOC	Total PM			NOX	CO	VOC	Total PM
IR - 203	Intermediate	10,919	30.02	0.36	0.21	2.31	41	0.39	10.51	0.13	0.07	0.81
IR - 207	Intermediate	10,919	30.02	0.36	0.21	2.31	41	0.35	9.51	0.11	0.07	0.73
Total Emissions for AQCR San Francisco Bay Area Basin									**20.02**	**0.24**	**0.14**	**1.54**

FY06

Travis

1 inch = 60 NM IR 203 = 2.625 inches

IR 207 = 2.375 inches

MTR #	Map Distance (inches)	Distance (nautical miles)	Speed (mi/hour)	Time in Mode (hours)
IR - 203	2.625	157.50	402.78	0.39
IR - 207	2.375	142.50	402.78	0.35

Total Aircraft Time in Mode @ AQCR San Francisco Bay Area Basin

Speed (knots) 350

MTR #	Power setting	Fuel Consumption Rate (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# of Ops per MTR	Total A/C Time in Mode (hr)	Total Emissions (tons/year)			
			NOX	CO	VOC	Total PM			NOX	CO	VOC	Total PM
IR - 203	Intermediate	10,919	30.02	0.36	0.21	2.31	62	0.39	15.89	0.19	0.11	1.22
IR - 207	Intermediate	10,919	30.02	0.36	0.21	2.31	62	0.35	14.38	0.17	0.10	1.11
Total Emissions for AQCR San Francisco Bay Area Basin									**30.27**	**0.36**	**0.21**	**2.33**

MTR Summary									
	Aircraft Emissions				Change from Baseline				
	NOX	CO	VOC	Tot PM	NOX	CO	VOC	Tot PM	
Baseline	0	0	0	0	0	0	0	0	Baseline
FY04 - 203	5.13	0.06	0.04	0.39	5.13	0.06	0.04	0.39	FY04 - 203
FY04 - 207	4.64	0.06	0.03	0.36	4.64	0.06	0.03	0.36	FY04 - 207
FY05 - 203	10.51	0.13	0.07	0.81	5.38	0.06	0.04	0.41	FY05 - 203
FY05 - 207	9.51	0.11	0.07	0.73	4.87	0.06	0.03	0.37	FY05 - 207
FY06 - 203	15.89	0.19	0.11	1.22	5.38	0.06	0.04	0.41	FY06 - 203
FY06 - 207	14.38	0.17	0.10	1.11	4.87	0.06	0.03	0.37	FY06 - 207
Total:					**30.27**	**0.36**	**0.21**	**2.33**	

BASELINE CALCULATIONS

AVIS BASELINE AIRCRAFT TRIM/POWER CHECK ACTIVITI

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt.	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests	Time per Test		Emissions (tons/year)			
Engine ID			(lb/hr)	NOx	CO	VOC	Total PM	(tests/yr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Idle	Idle	1,448	3.36	58.21	16.43	2.75	150	20	0.33	0.49	8.43	2.38	0.40
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	150	12	0.2	27.16	1.06	0.00	0.98
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	150	12	0.2	21.19	1.23	0.00	0.67
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	150	45	0.75	58.27	1.82	1.58	2.81
Project Emissions											**107**	**13**	**4**	**5**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

PROPOSED ACTION CALCULATIONS

TRAVIS PROPOSED AIRCRAFT TRIM/POWER CHECK ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt.	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests	Time per Test		Emissions (tons/year)			
Engine ID			(lb/hr)	NOx	CO	VOC	Total PM	(tests/yr)	(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	48	20	0.33	0.14	0.84	0.08	0.37
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	48	12	0.2	9.20	0.11	0.01	0.62
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	48	12	0.2	6.29	0.08	0.04	0.48
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	48	45	0.75	4.01	0.39	0.09	1.70
Project Emissions											**20**	**1**	**0**	**3**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt.	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests	Time per Test		Emissions (tons/year)			
Engine ID			(lb/hr)	NOx	CO	VOC	Total PM	(tests/yr)	(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	84	20	0.33	0.27	4.72	1.33	0.22
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	84	12	0.2	15.21	0.60	0.00	0.55
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	84	12	0.2	11.87	0.69	0.00	0.38
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	84	45	0.75	32.63	1.02	0.88	1.57
Project Emissions											**60**	**7**	**2**	**3**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS:	80	8	2	6
DIFFERENCE IN TOTAL EMISSIONS: Tons/year	**-27**	**-4**	**-2**	**1**
New Total Emissions:	80	8	2	6

PROPOSED ACTION CALCULATIONS - FY04

TRAVIS PROPOSED AIRCRAFT TRIM/POWER CHECK ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	16	20	0.33	0.05	0.28	0.03	0.12
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	16	12	0.2	3.07	0.04	0.00	0.21
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	16	12	0.2	2.10	0.03	0.01	0.16
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	16	45	0.75	1.34	0.13	0.03	0.57
Project Emissions											**7**	**0**	**0**	**1**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	124	20	0.333333	0.40	6.97	1.97	0.33
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	124	12	0.2	22.45	0.88	0.00	0.81
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	124	12	0.2	17.52	1.01	0.00	0.55
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	124	45	0.75	48.17	1.50	1.31	2.32
Project Emissions											**89**	**10**	**3**	**4**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS:	95	11	3	5

PROPOSED ACTION CALCULATIONS - FY05

TRAVIS PROPOSED AIRCRAFT TRIM/POWER CHECK ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
117-PW-10	Taxi/Idle-ou	Idle	1,104	3.96	23.86	2.15	10.54	32	20	0.33	0.09	0.56	0.05	0.25
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	32	12	0.2	6.14	0.07	0.01	0.41
# Engines	Climbout	ntermediat	10,919	30.02	0.36	0.21	2.31	32	12	0.2	4.20	0.05	0.03	0.32
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	32	45	0.75	2.68	0.26	0.06	1.13
Project Emissions											**13**	**1**	**0**	**2**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
39-GE-1A/	Taxi/Idle-ou	Idle	1,448	3.36	58.21	16.43	2.75	104	20	0.333333	0.34	5.84	1.65	0.28
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	104	12	0.2	18.83	0.74	0.00	0.68
# Engines	Climbout	ntermediat	12,541	28.16	1.63	0	0.89	104	12	0.2	14.69	0.85	0.00	0.46
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	104	45	0.75	40.40	1.26	1.10	1.94
Project Emissions											**74**	**9**	**3**	**3**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

	NOx	CO	VOC	Tot PM
TOTAL EMISSIONS:	87	10	3	5

PROPOSED ACTION CALCULATIONS - FY06

TRAVIS PROPOSED AIRCRAFT TRIM/POWER CHECK ACTIVITIES

C-17	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
F117-PW-100	Taxi/Idle-out	Idle	1,104	3.96	23.86	2.15	10.54	48	20	0.33	0.14	0.84	0.08	0.37
Input	Take-off	Military	13,976	34.3	0.4	0.03	2.31	48	12	0.2	9.20	0.11	0.01	0.62
# Engines	Climbout	Intermediate	10,919	30.02	0.36	0.21	2.31	48	12	0.2	6.29	0.08	0.04	0.48
4	Approach	Approach	4,279	13.03	1.25	0.3	5.52	48	45	0.75	4.01	0.39	0.09	1.70
Project Emissions											**20**	**1**	**0**	**3**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

C-5	Aircraft Cycle Mode	Power Setting	Fuel Cnsmpt. (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				# OF Tests (tests/yr)	Time per Test		Emissions (tons/year)			
Engine ID				NOx	CO	VOC	Total PM		(min)	(hr)	NOx	CO	VOC	Total PM
TF39-GE-1A/1C	Taxi/Idle-out	Idle	1,448	3.36	58.21	16.43	2.75	84	20	0.33	0.27	4.72	1.33	0.22
Input	Take-off	Military	13,861	32.66	1.28	0	1.18	84	12	0.2	15.21	0.60	0.00	0.55
# Engines	Climbout	Intermediate	12,541	28.16	1.63	0	0.89	84	12	0.2	11.87	0.69	0.00	0.38
4	Approach	Approach	10,477	24.72	0.77	0.67	1.19	84	45	0.75	32.63	1.02	0.88	1.57
Project Emissions											**60**	**7**	**2**	**3**
		Sample Calculation: Fuel Consumpt (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x No. of Tests x No. Engines x TIM (hr) x (tons/2000 lb)												

TOTAL EMISSIONS:

NOx	CO	VOC	Tot PM
80	8	2	6

Trim Checks Summary									
	Trim Check Emissions				Change from Baseline				
	NOx	CO	VOC	Tot PM	NOx	CO	VOC	Tot PM	Difference
Baseline	107	13	4	5	0	0	0	0	Baseline
FY 04	95	11	3	5	-12	-2	-1	0	FY 04
FY 05	87	10	3	5	-20	-3	-1	0.6	FY 05
FY 06	80	8	2	6	-27	-4	-2	1.0	FY 06
Net:					**-59**	**-9**	**-3**	**2**	

NEW

NEW CONSTRUCTION - PROPOSED EF from CEQA Handbook, Table 9-1; Industrial

Emissions in total pounds

Building Description	Square Feet	ROC	NOX	CO	PM10	Construction Time (days)
			EF/1000 ft2 GFA			
		32.79	481.88	104.79	34.22	
C-17 Flight Simulator Facility	12750	1.1454	16.8328	3.6605	1.1954	365
C-17 Maintenance Training Facility	26120	2.3465	34.4841	7.4989	2.4488	365
C-17 AGE Storage Facility	33400	3.0005	44.0953	9.5890	3.1314	365
C-17 Flightline Support Facility	40010	3.5943	52.8220	11.4867	3.7511	365
C-17 Hangar	84280	7.5713	111.2681	24.1964	7.9015	365
C-17 Hangar	84280	7.5713	111.2681	24.1964	7.9015	365
C-17 Nose Dock	29760	2.6735	39.2897	8.5440	2.7901	365
C-17 Nose Dock	29760	2.6735	39.2897	8.5440	2.7901	365
C-17 Squadron Operations/Aircraft Main	35020	3.1460	46.2341	10.0541	3.2832	365
C-17 Engine Facility	22240	3.9850	58.5629	12.7351	4.1588	183
C-17 Composite Materials Shop	16942	3.0357	44.6121	9.7014	3.1681	183
C-17 Fiberglass Shop	16942	3.0357	44.6121	9.7014	3.1681	183
C-17 Tire and Wheel Shop	7245	1.2982	19.0777	4.1487	1.3548	183
C-17 Munitions Facility	5350	0.4806	7.0632	1.5360	0.5016	365
Addition and Alteration to Life Support F	3100	0.5555	8.1630	1.7751	0.5797	183
Flight Simulator Facility Expansion	2500	0.3373	4.9576	1.0781	0.3521	243
Roads and Utilities	undetermined					183
Taxiway Lima	610000	109.3000	1606.2667	349.3000	114.0667	183
Roads and Utilities	undetermined					365
Road Relocation	240000	43.0033	631.9738	137.4295	44.8787	183
300 Parking Apron Improvement	2500000	269.6546	3962.8289	861.7599	281.4145	304
Total:	3799699	468.4083	6883.7018	1496.9352	488.8360	lbs
		0.2342	**3.4419**	**0.7485**	**0.2444**	**tons**

NEW

NEW CONSTRUCTION - FUTURE **EF from CEQA Handbook, Table 9-1; Industrial**

Emissions in total pounds

Building Description	Square Feet	ROC	NOX	CO	PM10	Construction Time (days)
			EF/1000 ft2 GFA			
		32.79	481.88	104.79	34.22	
F-16 Detachment		0	0	0	0	1
Construct Army Recruiting Battalion Fac	12152	398.4641	5855.8058	1273.4081	415.8414	1
Construct Coast Guard Facility	103000	3.6992	54.3632	11.8219	3.8605	913
Global Reach Deployment Facility	92190	8.2819	121.7110	26.4674	8.6431	365
Repair Runway 21 Left/03 Right Electric	NA					183
Construct Combat Arms Campus	18083	1.6245	23.8735	5.1916	1.6953	365
Construct Fire/Crash Rescue Station	30192	2.7123	39.8601	8.6680	2.8306	365
Construct In-Flight Kitchen/Fleet Service	23000	2.0662	30.3650	6.6032	2.1563	365
Construct Passenger Terminal		0.0000	0.0000	0.0000	0.0000	365
Construct Fitness Center Addition	43000	3.8629	56.7694	12.3451	4.0314	365
Repair Runway 21 Left/03 Right Electric	NA					183
Construct AGE Facility	26931	2.4194	35.5548	7.7318	2.5249	365
Base Civil Engineer Complex	11877	1.0670	15.6802	3.4098	1.1135	365
Total:	360425	424.1975	6233.9831	1355.6468	442.6971	lbs
		0.2121	**3.1170**	**0.6778**	**0.2213**	**tons**

Total New Construction

ROC	**NOX**	**CO**	**PM10**	
892.6058	13117.6849	2852.5820	931.5331	lbs
0.4463	6.5588	1.4263	0.4658	tons